



VARIETAL STUDIES
OF
FLUE-CURED, BURLEY AND
DARK TOBACCOS

BY

N. A. MACRAE, M.Sc.,
TOBACCO DIVISION, CENTRAL EXPERIMENTAL FARM

AND

R. J. HASLAM, B.S.A.,
DOMINION EXPERIMENTAL STATION, HARROW, ONTARIO

TOBACCO DIVISION
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TABLE OF CONTENTS

| | PAGE |
|--|------|
| I. Introduction..... | 5 |
| II. Object of investigation..... | 5 |
| III. Historical sketch..... | 6 |
| IV. Present taxonomic status..... | 7 |
| V. Local development..... | 8 |
| VI. Source of material..... | 9 |
| VII. Methods..... | 9 |
| (a) Field growth measurements..... | 9 |
| (b) Description of growing plant and green leaf..... | 10 |
| (c) Relative maturity..... | 10 |
| (d) Relative yield..... | 11 |
| (e) Sorting and grading..... | 11 |
| (f) Quality..... | 12 |
| (g) Price and grade index..... | 12 |
| VIII. Flue-cured varieties..... | 13 |
| (a) Field growth measurements..... | 13 |
| (b) Description of growing plant and green leaf..... | 15 |
| (c) Relative maturity..... | 19 |
| (d) Relative merits, yield and grade index..... | 21 |
| (e) Brief discussion..... | 29 |
| IX. Burley varieties..... | 29 |
| (a) Field growth measurements..... | 29 |
| (b) Description of growing plant and green leaf..... | 31 |
| (c) Relative maturity..... | 35 |
| (d) Relative merits, yield and grade index..... | 36 |
| (e) Brief discussion..... | 40 |
| X. Dark varieties..... | 41 |
| (a) Field growth measurements..... | 41 |
| (b) Description of growing plant and green leaf..... | 42 |
| (c) Relative maturity..... | 44 |
| (d) Relative merits, yield and grade index..... | 45 |
| (e) Brief discussion..... | 49 |
| XI. General summary..... | 49 |
| XII. Acknowledgments..... | 50 |
| XIII. Literature cited..... | 50 |
| XIV. Illustrations..... | 51 |
| XV. Appendix..... | 55 |



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VARIETAL STUDIES OF FLUE-CURED, BURLEY AND DARK TOBACCOS

By N. A. MACRAE, M.Sc., and R. J. HASLAM, B.S.A.

I. INTRODUCTION

Since the generic revision of *Nicotiana* by Comes, who in 1899 described forty-one species, some thirty additional species have also been described. It is doubtful, however, if any of the great herbaria in the world today contain specimens of over one-half of these described species. With such a condition existing, considerable difficulty is encountered when an attempt is made to determine many of these species. This is chiefly due to two reasons: (1) several species have been collected but once, (2) many of the original descriptions are indefinite and contain no figures or data, making identification difficult.

Owing to its commercial importance *Nicotiana tabacum*, of which numerous varieties exist, is the most extensively grown species. Distinctive differences include variations in flower colour from various shades of red, through pink, to white; flower size and shape; teratological mutations in pistil, stamens, corolla and calyx; shape, texture and number of leaves; habit of growth and probable resistance to disease. With such inter-relationships and inter-gradations of characteristics ranging from one extreme to the other, it is exceedingly difficult to readily differentiate the many varieties and forms. Many authors have tried to refer existing varieties to from four to six typical forms. The chief objection to this as a permanent guide is found in the fact that all varieties cross freely and in consequence little may be gained by such efforts.

II. OBJECT OF INVESTIGATION

The difficulty of identifying certain species within the genus *Nicotiana* is accentuated, when an attempt is made to identify any one particular variety or form. The prevalence of overlapping and inter-grading of characters, found in closely related but apparently different plants, makes the identification of varieties within this species a very obstinate problem.

The taxonomic problems in *N. tabacum* do not appear to differ greatly from those presented by many other species of cultivated plants. Barley, maize, wheat, oats and rice, among others, exhibit a similar diversity of forms with more or less obvious class distinctions. In each of these, as in *N. tabacum*, it is an easy matter to shuffle and recombine characters indefinitely.

The segregation of forms into distinct species on genetic grounds has not been accomplished as yet. The character differences, moreover, among varieties of *N. tabacum* do not for the most part rest upon a simple genetic basis. They more often depend upon very complex and involved Mendelian combinations, and the results of many experiments have failed to show segregation in accordance with any of the accepted formulae.

Under the single species, *N. tabacum*, is grouped as varied an assemblage of varieties, forms, and suspected hybrids, as were ever brought together under one specific name. There is no exact agreement as to what are the simplest expressions of the fundamental types. No attempt is being made in this bulletin to deal with this phase of the problem. It is essential, however, and it is hoped

that some order will be brought out of chaos by studying these forms and varieties which are more directly the result of hybridization and selection than of acclimatization and adaptation. The various forms and varieties are accepted as they exist today, and an endeavour is made to study the individual characteristics of these forms and varieties as they are known and grown in the tobacco industry.

III. HISTORICAL SKETCH

Considerable literature dealing with various phases of many problems of tobacco has been published. The principal contributing countries have been the United States, Holland, Germany and Italy, with tobacco breeding constituting the major part of all discussions. The more important papers, dealing with varietal studies and classifications, are briefly referred to here.

Comes in 1899 and 1905 referred all existing forms to six varieties:—

Fruticosa Hook,
Lancifolia (W.) Comes
Virginica (Agdh.) Comes
Brasiliensis Comes
Havanensis (Lag.) Comes
Macrophylla Schrank

This classification is based on leaf-shape with some consideration given to corolla-shape. Neither *Virginica* nor *Brasiliensis* are found in a pure state.

Anastasia (1907) did not agree with this classification and offered several criticisms in which the basic varieties were reduced from six to four:—

Havanensis
Brasiliensis
Virginica
Purpurea

In the following year (1908) Comes replied to the criticisms directed at his work.

By a series of genetic experiments the Howards in 1910 attempted to classify the cultivated forms of *Nicotiana tabacum*. They used the Indian type and were able to dissociate 51 kinds. All were keyed on a basis of leaf-form and length of internode. This was perhaps the first attempt at a morphological classification by genetic experimentation. Such a classification can, undoubtedly, be challenged since petiolate forms may be obtained by crossing two distinctly sessile forms. Tracing the derivation of variable cultivated species by a morphological classification was shown to be quite impossible. Miss Howard later claimed that her scheme of classification was merely a useful empirical key without any phylogenetic value.

Hasselbring in 1912 discussed the various types of *N. tabacum* grown in Cuba and has shown that they remained true to type when transferred and grown in the state of Michigan.

In 1912 Setchell tentatively selected five types and described those as seemingly fundamental. In this work a few other types of experimental significance are also described, and it is very difficult to precisely determine which of these are the fundamentals by any deductions from the statements. In 1922 Setchell et al, reported the results obtained by crossing certain of these varieties. It was felt that, if these five fundamental varieties were considered by themselves as wild plants, any taxonomist of the present day would award to each of them the rank of a separate species.

IV. PRESENT TAXONOMIC STATUS

From the various attempts at classification of the many forms and varieties, within this species, there have resulted at least three different sets (Comes, Anastasia and Setchell). The degree of coincidence which prevails among them is not definitely known, as some forms seem to be listed under one of the fundamental varieties in one set and under another variety in another set. The earlier classifications are, as a consequence, quite obsolete and are of no practical value to the commercial man at the present time. Varieties have been given so many different names that such nomenclature has practically no significance. The common occurrence of natural crosses and the continued selection and changes in types resulting from this empirical process have made investigations and study very involved.

Out of the entire series of tobacco plants, which formed the basis of the earlier attempts at classification, there appeared to be five or six forms which differed fundamentally from one another. These forms differed in habit of growth and type of leaf and flower. They apparently presented, in the simplest form, the elements out of which all, or nearly all, of the cultivated tobaccos have been built up through combination. These fundamental forms cross freely and may be recovered, in more or less detail, in breeding; consequently they are considered by geneticists to be merely varieties or forms rather than independent species.

The terms of common usage today have a more practical bearing upon the method of curing than upon the variety. All commercially grown varieties or strains are chiefly referred to as being either Burley, Maryland, flue-cured (Virginia leaf), dark fire-cured, cigar (binder or wrapper) or pipe tobaccos. It is, however, interesting to note, according to Setchell, that only one of the varieties can probably be thought of as coming into connection with the various types designated under the various terms of Burley. These tobaccos, so far as is now recognized, are distinctly of the "Maryland" or "Virginica" types. The white Burley seems to have originated as a sudden sport or mutant from the dark Burley. The dark Burley seems to be closely associated with the Blue Pryors. This type is probably quite old and a distinct type which varies little in habit of growth, leaf and flower characteristics, but more in leaf dimension and reaction to curing. The Brazilian, which seems to have a thinner leaf, somewhat bent over at the tip, is apparently the type utilized for wrappers. It has suitable texture and size and its better forms have little, if any, flavour.

Many smoking tobaccos are a combination of the Maryland and the Brazilian types. "Cavala" is the cigarette type with short leaves and considerable flavour. It apparently is an admixture of the Havana types of tobaccos and is used almost entirely on account of its flavour.

A few comments presented by W. W. Garner, of the U.S.D.A. are also of considerable value. From this it would appear that several distinctly different forms of *Nicotiana tabacum* were in existence when Columbus first visited America, and at least four of these were used by the Spaniards in the early days of culture in the West Indies. Of these forms, one possessed an exceedingly long and narrow leaf which might well be the forerunner of the present day one-sucker type. Another was described as having a rather large leaf and veins perpendicular to the midrib. A third form was said to have a very small and highly aromatic leaf, and might easily be the mother type of the present day Turkish type. It is not difficult to imagine, therefore, that, by crossing these four forms, numerous new varieties would result, but in this connection only surmise is possible. The Orinoco, which is the mother type of the flue-cured group, presumably came, directly or indirectly, from the Orinoco region of South America. The original Maryland type might well be derived directly from one of the large leaf sorts mentioned above. It is possible also that the Pryor group

of varieties, used in culture of both bright and dark tobaccos, is derived from one of these forms. It seems to be well established that the Connecticut Broadleaf, or seedleaf, was derived directly from the Maryland Broadleaf, and all other northern seed leaf types are to be regarded as having been developed from the Connecticut Broadleaf. The so-called Spanish varieties are identical with the Connecticut Havana, and all are derived directly from Cuba.

V. LOCAL DEVELOPMENT

Although tobacco has been grown in Western Ontario since the coming of the early settlers, the industry had no special commercial importance until the beginning of the twentieth century. At this early period tobacco-growing was confined largely to Essex County. Tobacco produced in other parts of the province was grown mainly in garden lots and played a small part in the local trade.

The industry lagged in its early development. It received a slight impetus during international disturbances such as the Boer War and Great War, but steady growth and stabilization only became a realization when suitable types and varieties were grown. The Canadian manufacturer then gradually realized the value of the home-grown product and soon began to absorb a larger portion of the crop each year. With the increased demand for the Canadian product the tobacco-growing area expanded to other counties. With the introduction of the White Burley type, sections in Kent and Elgin counties soon became productive centres. Again, in recent years, with the expansion of the flue-cured cigarette tobacco, sections in East Elgin, Oxford, Norfolk, and a small acreage in Brant county, have become very important in the production of that type.

The development of the industry, therefore, more or less hinges around three major factors: namely, (1) the introduction of better types and varieties, (2) the gradual increase in the use of the native grown product by the Canadian tobacco manufacturer, and (3) the increased protection given the industry by the Dominion Government in the way of import duties on the foreign leaf.

Research in breeding and selection, with the introduction of new types and varieties undoubtedly played a very important part in providing a distinct impetus to the industry.

Fluctuation in price and production and gradual changes in the demand for the manufactured product had a marked influence on the development and introduction of new types. For instance, over-production of heavy smoking and chewing tobacco at the beginning of the twentieth century, and also the possibility of growing a lighter type of tobacco, had a great influence in introducing the flue-cured tobacco type. Furthermore, the development of the flue-cured industry soon created less demand for heavy-bodied broadleaf Burley, and those growers, whose soil was unfitted for growing flue-cured tobacco, found a standup—a lighter type of Burley—a more profitable crop. Again, the demand in recent years for more of a cigarette type of flue-cured tobacco has caused a further change in choice of variety; the old stalk-cut varieties, Warne and Hickory Pryor, have been replaced by more suitable priming varieties.

Local development of the industry may be divided into five fairly definite periods with particular regard to the different types and varieties of tobacco, namely: (1) the pioneer period, (2) the introduction of the White Burley type, (3) the introduction of the flue-cured type, (4) replacement of broadleaf Burley with standup type, and (5) the introduction of the priming type of cigarette flue-cured tobacco.

During the pioneer period a very heavy, dark, coarse tobacco known as "Thick set" was grown. This variety was used mainly in the manufacture of chewing and plug tobacco. The beginning of the second period, when the White Burley type was first introduced, dates back to about 1880. Production of this

type, known as the old-fashioned broadleaf, continued slowly until about 1906, when the first crop of flue-cured tobacco was grown. The production of flue-cured tobacco remained in the experimental stage for five or six years before it reached a stage of commercial importance. With the establishment of the flue-cured type the industry received greater stimulation than at any period during its development. It was about this stage of the industry that many of the tobacco processing and manufacturing plants now functioning became established. The variety "Warne" was the first variety introduced with the flue-cured industry, and remained the outstanding variety until more suitable varieties were introduced for priming.

The fourth stage of the industry was mainly a change in the type of Burley grown. The demand for finer-textured, brighter-coloured Burley tobacco gradually replaced the old-fashioned broadleaf type. From 1920 to 1925 Station Standup and Broadleaf Resistant Burley became popular. These varieties were followed with still finer varieties of the cigarette type, including Standup Resistant, Judy's Pride, and Halley's Special.

The fifth stage of the industry includes a change in the type of flue-cured tobacco grown. The greater demand for a cigarette type of leaf gave impetus to new and finer leaf varieties. This change came about 1930, and Warne was replaced with different strains of Orinoco, Bonanza, and Yellow Mammoth.

No definite line of demarcation can be drawn between each succeeding period, as each period more or less dovetails into the period following or preceding. Furthermore, from 1900 onward, other special types and varieties played a part in the industry. Zimmer Spanish, Connecticut Seedleaf, and General Grant were all grown during the old-fashioned broadleaf Burley period. Snuff and Green River varieties were introduced later and still find a prominent place in the industry.

Undoubtedly, evolution in the matter of tastes, the addition of feminine smokers, and the keener competition in establishing new appetites, have had a marked influence in bringing about the various changes in the tobacco-growing industry.

VI. SOURCE OF MATERIAL

The seed of the varieties, included in these tests, was collected from different tobacco growing districts in Canada and the United States by the Superintendent of the Dominion Experimental Station, Harrow, Ontario. This assortment of varieties and strains is fairly complete and, with very few exceptions, all the varieties listed were included in the test since its beginning in 1930. In the meantime, however, a few new ones, which were not available at that time, were introduced later.

In 1932 an attempt was made to group the varieties within each type on the basis of certain resemblances and uniformity. Consequently each variety is found in one or other of the many groups of each type. The varietal name, serial and group number, as well as the source of each variety, is found in the Appendix.

VII. METHODS

(a) Field Growth Measurements

As the varieties within the various types were transplanted on the same day, attempts were made, where possible, to collect all field growth data for each particular type within a few days. The early bud was selected as the most convenient stage for this purpose, but in a few varieties notes were collected on more advanced plants. It must also be remembered that these notes were taken over a period of three years and that considerable variation occurred in varietal responses as a result of varying seasonal conditions. Were all environmental

factors controlled, it would then be possible to eliminate differences in rate of growth and development from one season to another, thereby obtaining identical yearly performances of each variety. The significance of the measurements taken, however, can only be appreciated, when it is realized that the information obtained was for comparative purposes only, where the characteristics of each variety were studied in relation to the others under similar conditions. It must also be recognized that the results for one year are not necessarily an indication of what might be expected for that same variety the following year, under different conditions. A whole complex of factors such as soil type, nitrogen content, and climatic factors influence plant growth and development, and consequently, duplicates in behaviour are difficult to obtain. The results therefore are only relatively accurate.

The measurements on height and number of leaves before topping were made from the ground level to the axillary leaf below the bald or spike sucker. The plants were then topped to conform with accepted practices, that is, each plant was topped to carry the maximum number of leaves which it was apparently capable of maturing. Leaf measurements were taken from a representative middle leaf and the indices were computed by dividing the length by the width and multiplying by one hundred. The length of internodes was also computed on the basis of the number of leaves and the height of the plant before and after topping.

(b) Description of Growing Plant and Green Leaf

All the plants were examined before topping, when the position of the leaf on the stalk, as well as the relative height of the plant and length of internodes, was taken into consideration. At this time also, representative leaves were selected and described as to shape, with particular attention devoted to the tip and base. Leaf surface and colour were examined carefully also.

(c) Relative Maturity

The data collected with reference to maturity are mostly relative. This is especially true with the Burley and dark varieties. A day or so before these varieties were harvested notes were taken judging their maturity as early, medium early, medium late and late. The date of planting and harvesting was recorded. Most of the varieties were harvested when they were considered ripe. The Burley varieties required about 80 days to mature. This period represents the number of days between transplanting to harvesting. All varieties immature at this time were allowed to remain in the field from 4 to 7 days longer. Those which were still green, when the last harvest was made, were considered as being late and recorded as such.

The maturity data on the dark varieties are distinctly relative. The period of time between transplanting and time for harvesting of the early varieties amounted to 90 to 94 days. The notes taken were similar to those collected for the Burley varieties but all varieties were harvested 98 to 100 days after transplanting.

The data recorded on the flue-cured varieties are probably more accurate owing to improved methods of harvesting. Each variety was primed as it approached maturity. The number of days between transplanting and each priming constituted the time interval in days from transplanting, to first, second, third priming, and final harvesting. In 1932 the season was such that four primings were necessary for the early maturing varieties and only three on the later ones. In 1933 the very late ones were harvested in two primings.

It may be stated here that judging the maturity of tobacco is entirely different from judging the maturity of other field crops under experimentation. In most crops the development and ripening of the seed indicates the degree of maturity. In tobacco, however, the condition of the leaf determines maturity and a whole complex of factors, environmental and otherwise, influences this condition.

(d) Yields

The method of determining yields of the different tobacco varieties in the classification test was constant for all types and for all varieties within the type.

The weight of the cured leaf was recorded on the number of plants harvested, and then calculated to an acre basis of a perfect stand of plants.

The formula used for this purpose is as follows:—

$$\frac{\text{Number of plants required for one acre at a specified distance of planting}}{\text{Number of plants harvested}} = \text{Acre factor.}$$

$$\text{Acre factor} \times \text{Weight of cured leaf tobacco harvested from plot} = \text{Relative yield per acre.}$$

The number of plants harvested was recorded at harvesting time, and in the case of stalk-cut tobacco these records were rechecked when the tobacco was stripped and graded. No allowance was made for moisture content, but precaution was taken to perform the operations of bulking down, casing, and grading under constant conditions for all varieties within a type. The amount of moisture, however, would only vary with the ability of any particular variety to hold more moisture than another variety under the same conditions. The heavier varieties possibly would take up more moisture at bulking and casing than the lighter varieties. The better quality varieties are also more retentive of moisture than the poorer quality varieties. It is hardly likely, however, that any group of varieties would contain more than 18 to 20 per cent moisture, which is the approximate amount found in a commercial crop on delivery to the redrying and processing plants.

(e) Sorting and Grading

When tobacco is harvested by the priming method, as in the case of the flue-cured type, the leaves are picked from three or four fairly distinct regions—bottom, lower middle, upper middle, and top of the plant. The leaves from these different regions vary in texture, colour, and body thickness. The first priming of the various flue-cured varieties, consisting of sand or bottom leaves, was graded further into about three grades: (1) trashy lugs, (2) bright lugs, and (3) cutter lugs. A “lug” is the common term representing a thin leaf towards the lower region of the plant. The different grades of lugs varied in colour, such as lemon, orange, or mixed green. The leaves from the lower middle region of the plant were sorted also into about three to four grades: (1) mixed lugs, (2) lemon cutters, (3) orange cutters, and (4) mixed green leaf. A “cutter” is a fine-textured, thin, well-finished leaf. It really represents a high class leaf too good to go into a mixed lug grade. The upper middle portion of the plant produced a lemon, orange, mixed, mahogany, and green grade, depending on the variety; while the top region or final priming constituted about three grades: (1) orange, (2) mixed, and (3) green tips. The separation of the leaves into the various grades was based on colour, texture, and body thickness.

ring mainly to green tips and low grade, dark, spongy leaf. A good variety of cigarette flue-cured tobacco should furnish at least 20 to 25 per cent of fancy lemon cutters.

The best grade of the Burley type may be represented by a fancy grade of fine bright leaf, sufficiently bright and thin enough for the manufacture of cigarettes. The relative price value of this grade ranged as high as 25 cents per pound. The poorest grade of any variety was represented by a very poor grade of short dark tips valued at 1 to 2 cents per pound. A good cigarette variety should produce at least 30 per cent of the fancy grade.

Dark tobacco, unless used for snuff, is usually valued by the ability of the variety to produce heavy dark wrappers. In the classification work fancy dark wrappers were valued at 30 cents per pound, and the best varieties ran from 35 to 40 per cent of this grade.

VIII. FLUE-CURED VARIETIES

(a) Field Growth Measurements

In the field a study was made as to the general growth characteristics of the varieties. Consideration was given the height of the plants, shape and size of the leaves, number of leaves, and length of internodes.

The average height of all flue-cured varieties was found to be 37.5 inches. This figure was fairly consistent for all groups except the varieties included in Group 1 which were slightly taller and earlier in maturity. The number of leaves, both before and after topping, was also very consistent. In nearly every case this number consisted of either twelve or thirteen harvestable leaves, providing the plants were all stalk-cut. The priming method, on the other hand, increases the number of harvestable leaves to 15 or 16. The varieties in Group 6 possessed the narrowest leaf, with an index of 44.9. The widest leaves were those found in Group 1 having an average leaf index of 54.6.

Data relative to these measurements are found in Table I. In this table averages for each variety are given for three years, as well as averages for each group and averages of all groups, to include all flue-cured varieties.

TABLE 1.—FIELD GROWTH MEASUREMENTS

FLUE-CURED VARIETIES

| Number of variety | Plant | | | | Stalk | | Leaf | | |
|-------------------|----------------|---------|--------------------------|---------|----------------------|---------|--------|-------|-------|
| | Average height | | Average number of leaves | | Length of internodes | | Length | Width | Index |
| | Not topped | Top-ped | Not topped | Top-ped | Not topped | Top-ped | | | |
| | in. | in. | | | in. | in. | in. | in. | |
| 26 (1)..... | 39.9 | 31.4 | 19.9 | 12.5 | 2.0 | 2.8 | 16.6 | 10.4 | 54.1 |
| 27 (1)..... | 41.5 | 31.8 | 19.2 | 12.4 | 2.2 | 2.6 | 16.4 | 8.9 | 54.2 |
| 28 (1)..... | 42.2 | 31.2 | 19.8 | 12.5 | 2.2 | 2.5 | 16.6 | 9.4 | 56.8 |
| 29 (1)..... | 42.4 | 32.5 | 20.1 | 12.5 | 2.1 | 2.6 | 16.5 | 9.3 | 54.0 |
| 54 (1)..... | 40.0 | 30.4 | 18.7 | 12.0 | 2.2 | 2.5 | 16.7 | 9.1 | 54.1 |
| | 41.2 | 31.5 | 19.5 | 12.4 | 2.1 | 2.6 | 16.6 | 9.4 | 54.6 |

TABLE 1.—FIELD GROWTH MEASUREMENTS—*Continued*

FLUE-CURED VARIETIES

| Number of variety | Plant | | | | Stalk | | Leaf | | |
|-------------------|----------------|---------|--------------------------|---------|----------------------|---------|--------|-------|-------|
| | Average height | | Average number of leaves | | Length of internodes | | Length | Width | Index |
| | Not topped | Top-ped | Not topped | Top-ped | Not topped | Top-ped | | | |
| | in. | in. | | | in. | in. | in. | in. | |
| 35 (2)..... | 34.3 | 26.2 | 18.2 | 12.3 | 1.9 | 2.1 | 16.9 | 8.3 | 49.0 |
| 46 (2)..... | 36.9 | 28.5 | 19.0 | 12.5 | 2.0 | 2.3 | 16.8 | 8.3 | 49.4 |
| 47 (2)..... | 34.9 | 27.1 | 18.9 | 12.4 | 1.9 | 2.2 | 17.0 | 8.7 | 51.0 |
| 48 (2)..... | 37.3 | 28.1 | 18.2 | 12.5 | 2.1 | 2.3 | 17.7 | 9.0 | 50.4 |
| 49 (2)..... | 37.1 | 29.2 | 17.7 | 12.1 | 2.1 | 2.4 | 18.2 | 9.7 | 52.7 |
| 57 (2)..... | 39.5 | 30.2 | 16.5 | 13.1 | 2.4 | 2.3 | 17.1 | 8.1 | 47.3 |
| 58 (2)..... | 34.2 | 28.2 | 17.9 | 13.2 | 1.9 | 2.1 | 17.3 | 8.2 | 47.4 |
| 61 (2)..... | | | | | Not available | | | | |
| | 36.3 | 28.2 | 18.1 | 12.6 | 2.0 | 2.2 | 17.3 | 8.6 | 49.6 |
| 34 (3)..... | 36.7 | 28.2 | 18.4 | 12.2 | 2.0 | 2.2 | 17.1 | 8.4 | 48.6 |
| 36 (3)..... | 38.3 | 29.5 | 18.4 | 12.2 | 2.1 | 2.4 | 16.8 | 8.9 | 52.4 |
| 37 (3)..... | 37.4 | 28.1 | 18.0 | 12.5 | 2.1 | 2.2 | 16.1 | 8.0 | 49.6 |
| 38 (3)..... | 37.3 | 28.8 | 17.5 | 12.5 | 2.2 | 2.3 | 16.6 | 8.6 | 51.6 |
| 51 (3)..... | 38.8 | 29.0 | 19.1 | 12.4 | 2.1 | 2.4 | 17.2 | 8.8 | 50.7 |
| 52 (3)..... | 39.0 | 28.4 | 18.6 | 12.5 | 2.1 | 2.3 | 17.6 | 8.7 | 49.0 |
| 59 (3)..... | 40.9 | 29.5 | 15.5 | 12.5 | 2.6 | 2.4 | 19.4 | 9.9 | 51.0 |
| 62 (3)..... | | | | | Not available | | | | |
| 64 (3)..... | | | | | Not available | | | | |
| 65 (3)..... | | | | | Not available | | | | |
| | 38.3 | 28.8 | 17.9 | 12.4 | 2.2 | 2.3 | 17.2 | 8.8 | 50.4 |
| 13 (4)..... | 39.1 | 28.8 | 18.7 | 12.7 | 2.1 | 2.3 | 16.5 | 8.9 | 53.6 |
| 14 (4)..... | 39.2 | 28.9 | 19.7 | 13.1 | 2.0 | 2.3 | 17.5 | 8.9 | 50.7 |
| 15 (4)..... | 36.2 | 27.6 | 19.2 | 12.4 | 1.9 | 2.2 | 17.3 | 8.8 | 51.0 |
| 17 (4)..... | 37.7 | 27.1 | 19.2 | 12.7 | 2.0 | 2.1 | 17.4 | 8.6 | 49.2 |
| 18 (4)..... | 34.6 | 25.0 | 19.7 | 12.8 | 1.8 | 1.9 | 16.6 | 8.3 | 50.1 |
| 19 (4)..... | 34.1 | 25.0 | 19.4 | 12.4 | 1.8 | 2.0 | 16.1 | 8.0 | 49.2 |
| 53 (4)..... | 40.1 | 30.2 | 19.1 | 12.3 | 2.1 | 2.5 | 17.4 | 9.1 | 52.4 |
| 55 (4)..... | 35.0 | 27.8 | 18.4 | 11.9 | 1.9 | 2.3 | 18.3 | 9.7 | 52.6 |
| 56 (4)..... | 39.4 | 29.5 | 17.8 | 12.0 | 2.3 | 2.5 | 18.5 | 9.8 | 53.2 |
| 60 (4)..... | | | | | Not available | | | | |
| | 37.3 | 27.8 | 19.0 | 12.5 | 2.0 | 2.2 | 17.3 | 8.9 | 51.1 |
| 21 (5)..... | 36.1 | 27.3 | 20.6 | 12.6 | 1.7 | 2.2 | 16.0 | 8.4 | 51.7 |
| 22 (5)..... | 38.1 | 28.6 | 20.6 | 12.8 | 1.8 | 2.3 | 16.7 | 8.8 | 52.3 |
| 23 (5)..... | 38.5 | 28.3 | 20.3 | 12.7 | 1.9 | 2.2 | 16.1 | 8.5 | 52.6 |
| 43 (5)..... | 38.2 | 29.0 | 19.8 | 12.5 | 1.9 | 2.3 | 16.9 | 8.3 | 49.4 |
| 45 (5)..... | 34.1 | 28.0 | 18.4 | 12.3 | 2.1 | 2.3 | 16.3 | 8.7 | 52.9 |
| | 37.0 | 28.2 | 19.9 | 12.6 | 1.9 | 2.3 | 16.4 | 8.5 | 51.8 |
| 25 (6)..... | 36.6 | 24.7 | 17.7 | 12.0 | 2.1 | 2.1 | 17.6 | 7.8 | 43.9 |
| 33 (6)..... | 35.9 | 26.4 | 17.7 | 12.3 | 2.1 | 2.2 | 16.1 | 8.0 | 49.2 |
| 39 (6)..... | 37.0 | 26.8 | 17.8 | 13.0 | 2.1 | 2.1 | 17.0 | 7.4 | 43.5 |
| 44 (6)..... | 39.9 | 26.8 | 18.7 | 12.7 | 2.2 | 2.1 | 16.9 | 7.4 | 43.0 |
| | 37.3 | 26.2 | 18.0 | 12.5 | 2.1 | 2.1 | 16.9 | 7.6 | 44.9 |
| 16 (7)..... | 39.7 | 29.0 | 18.6 | 12.9 | 2.2 | 2.3 | 17.4 | 9.2 | 52.9 |
| 50 (7)..... | 36.9 | 28.5 | 19.4 | 12.8 | 1.9 | 2.2 | 18.6 | 10.4 | 55.6 |
| 63 (7)..... | | | | | Not available | | | | |
| | 38.3 | 28.8 | 19.0 | 12.9 | 2.1 | 2.3 | 18.0 | 9.8 | 54.1 |
| 20 (8)..... | 34.9 | 26.0 | 18.8 | 12.3 | 1.9 | 2.2 | 17.4 | 9.7 | 55.7 |
| 31 (8)..... | 36.1 | 24.8 | 21.8 | 13.2 | 1.8 | 1.9 | 22.6 | 12.2 | 53.9 |
| 42 (8)..... | 40.5 | 27.5 | 18.8 | 12.5 | 2.2 | 2.2 | 17.8 | 9.4 | 52.6 |
| | 37.2 | 26.1 | 19.8 | 12.7 | 2.0 | 2.1 | 19.4 | 10.4 | 54.1 |

TABLE 1.—FIELD GROWTH MEASUREMENTS—*Concluded*

FLUE-CURED VARIETIES

| Number of variety | Plant | | | | Stalk | | Leaf | | |
|-------------------|----------------|--------|-----------------------|--------|----------------------|--------|--------|-------|-------|
| | Average height | | Average number leaves | | Length of internodes | | Length | Width | Index |
| | Not topped | Topped | Not topped | Topped | Not topped | Topped | | | |
| | in. | in. | | | in. | in. | in. | in. | |
| 1 (9)..... | 34.2 | 24.6 | 17.3 | 12.4 | 2.0 | 2.0 | 18.7 | 8.8 | 47.1 |
| 2 (9)..... | 35.5 | 23.4 | 18.1 | 12.8 | 2.0 | 1.8 | 17.4 | 8.6 | 49.8 |
| 3 (9)..... | 33.4 | 24.9 | 18.2 | 12.5 | 1.9 | 2.0 | 17.6 | 9.0 | 51.0 |
| 4 (9)..... | 35.5 | 24.1 | 18.0 | 12.4 | 2.0 | 2.0 | 17.9 | 9.1 | 50.8 |
| 5 (9)..... | 36.7 | 24.5 | 18.2 | 12.3 | 2.0 | 2.0 | 17.8 | 9.0 | 50.2 |
| 6 (9)..... | 35.2 | 24.2 | 18.2 | 12.7 | 2.0 | 1.9 | 17.5 | 8.6 | 49.1 |
| 24 (9)..... | 36.3 | 25.5 | 18.5 | 12.8 | 2.0 | 2.0 | 18.4 | 8.5 | 46.2 |
| 30 (9)..... | 37.7 | 25.9 | 17.9 | 12.3 | 2.1 | 2.1 | 17.7 | 7.8 | 44.2 |
| 32 (9)..... | 40.5 | 27.3 | 17.3 | 12.2 | 2.4 | 2.2 | 17.8 | 8.1 | 45.3 |
| 40 (9)..... | 36.0 | 25.4 | 18.4 | 12.8 | 2.0 | 2.0 | 17.1 | 8.1 | 47.3 |
| 41 (9)..... | 42.4 | 25.9 | 16.7 | 12.2 | 2.6 | 2.1 | 17.9 | 8.4 | 46.7 |
| | 36.7 | 25.1 | 17.9 | 12.5 | 2.1 | 2.0 | 17.8 | 8.5 | 48.0 |
| Group (1)..... | 41.2 | 31.5 | 19.5 | 12.4 | 2.1 | 2.6 | 16.6 | 9.4 | 54.6 |
| " (2)..... | 36.3 | 28.2 | 18.1 | 12.6 | 2.0 | 2.2 | 17.3 | 8.6 | 49.6 |
| " (3)..... | 38.3 | 28.8 | 17.9 | 12.4 | 2.2 | 2.3 | 17.2 | 8.8 | 50.4 |
| " (4)..... | 37.3 | 27.8 | 19.0 | 12.5 | 2.0 | 2.2 | 17.3 | 8.9 | 51.1 |
| " (5)..... | 37.0 | 28.2 | 19.9 | 12.6 | 1.9 | 2.3 | 16.4 | 8.5 | 51.8 |
| " (6)..... | 37.3 | 26.2 | 18.0 | 12.5 | 2.1 | 2.1 | 16.9 | 7.6 | 44.9 |
| " (7)..... | 38.3 | 28.8 | 19.0 | 12.9 | 2.1 | 2.3 | 18.0 | 9.8 | 54.1 |
| " (8)..... | 37.2 | 26.1 | 19.8 | 12.7 | 2.0 | 2.1 | 19.4 | 10.4 | 54.1 |
| " (9)..... | 36.7 | 25.1 | 17.9 | 12.5 | 2.1 | 2.0 | 17.8 | 8.5 | 48.0 |
| True average..... | 37.7 | 27.9 | 18.8 | 12.6 | 2.0 | 2.2 | 17.4 | 8.9 | 51.0 |

(b) Description of Growing Plant and Green Leaf

The habit of growth of a plant in the field is determined, to a very large extent, by the position of the leaves on the stalk. In some instances, the leaves are attached at very sharp or acute angles to the stalk, thus presenting an erect and upright appearance. Leaves attached at very wide angles displayed a pronounced tendency to droop and in extreme cases hung somewhat from the plant. In most cases, however, the plants exhibited varying degrees of erectness.

Intimate resemblances of leaves of closely related varieties made detailed descriptions and differentiation of leaf shapes and types exceedingly difficult. An attempt was made to refer all shapes to one or more types as stenophyllate, lanceolate, latifoliate or ovate. Consideration was also given to the general contour or shape of the tip as acuminate, acute or obtuse. Leaf tips of many varieties were decidedly cucullate and in many cases this hooded part curved slightly to one side. The attachment of the leaf to the stem was noted also. Most leaves possessed margined petioles, and were usually decurrent, somewhat clasping and auriculate. Texture and colour of the leaf surface was also considered and described.

GROUP 1.—CASH

The varieties in Group 1 are tall with long internodes. The leaves are attached at wide angles to the stalk. They are medium green in colour, slightly ruffled at the surface, lanceolate to semi-ovate, and slightly cucullate.

GROUP 2—VIRGINIA

In Group 2 the plants are fairly erect with a medium elongation of the stalk. The general shape of the plant is pyramidal. The leaves are attached at medium wide angles and are fairly broad, medium smooth, light green in colour, and also slightly cucullate.

GROUP 3—ORINOCO

The varieties in Group 3 differ from those in Group 2 by their slightly darker green colour and more ruffled or puckered leaf-surface. The veins of the leaf are lighter than the leaf itself and are more prominent than those in Group 2. The plants possess a semi-erect, conical shaped appearance. The leaves are lanceolate to latifolate.

GROUP 4—PRYOR

This group takes in a large number of varieties. They resemble each other in habit of growth but vary in regard to maturity. These varieties are semi-erect, medium tall with medium long internodes. The leaves are fairly broad, mostly medium light to light green in colour, and exhibit a silky smooth appearance in the early stages of growth.

GROUP 5—ADCOCK

The varieties in this group slightly resemble those in Group 4 except that the leaves are shorter and fewer in number. The leaf surface is also more ruffled and does not display the same silky appearance.

GROUP 6—WILLOW LEAF

The plants are semi-erect and conical shaped with medium short internodes. The leaf is narrow and quite pointed, and grows with a dark green crinkled and ruffled appearance with a slightly cucullate tip. The midribs and veins are very prominent.

GROUP 7—PINKNEY

The general appearance of the varieties in Group 7 readily distinguishes them in the field from other varieties. The leaves are light green in colour and are attached to the stalk at fairly sharp angles, giving the plants a characteristic erectness in habit of growth. The internodes are medium short and the plants carry one to two more leaves than the average flue-cured variety. The leaves are smooth, broad, and round at the base, but taper towards the tip. The venation is medium fine and smooth and exhibits a much lighter shade of green than the leaf itself.

GROUP 8—BROADLEAF

The varieties in Group 8 also have well defined field growth characteristics. The plants are drooping, with fairly short internodes, and resemble the Broadleaf Burley varieties in habit of growth. The leaves are smooth and vary from a light green to a dark green in colour. They are broad and somewhat oval-shaped.

GROUP 9—WARNE

Group 9 includes most of the better known stalk-cut varieties. These plants grow with medium short internodes. The leaves are medium broad with fairly pointed slightly cucullate tips. They are light green in colour with a fine smooth dark green venation. The leaf surface is somewhat rough.

A brief description of varietal plant and leaf characteristics is given in Table 2.

TABLE 2—DESCRIPTION OF GROWING PLANT AND GREEN LEAF

FLUE-CURED VARIETIES

| Serial Number | Plant | Leaf |
|--------------------------|---|---|
| <i>Group 1—Cash—</i> | | |
| 26..... | Tall, semi-erect, leaves attached at wide angles. | Lanceolate to latifoliate, base obtuse, auriculate. Tip bluntly acute-cucullate, surface rough, medium green. |
| 27..... | Tall, semi-erect, leaves attached at wide angles. | Lanceolate to latifoliate, base obtuse, auriculate. Tip bluntly acute-cucullate, surface rough, medium green. |
| 28..... | Tall, semi-erect, leaves attached at wide angles. | Lanceolate to latifoliate, base obtuse, auriculate. Tip bluntly acute-cucullate, surface rough, medium green. |
| 29..... | Tall, semi-erect, leaves attached at wide angles. | Lanceolate to latifoliate, base obtuse, auriculate. Tip bluntly acute-cucullate, surface rough, medium green. |
| 54..... | Tall, semi-erect, leaves attached at wide angles. | Lanceolate to latifoliate, base sharply acute-auriculate. Tips sharply acute-cucullate, surface slightly rough, medium green. |
| <i>Group 2—Virginia—</i> | | |
| 35..... | Medium tall, semi-erect, leaves attached at wide angles. | Latifoliate, base acute-auriculate. Tip acute, surface smooth, light green. |
| 46..... | Medium tall, semi-erect, leaves attached at medium angles. | Latifoliate, base obtuse, auriculate. Tip acute-cucullate, surface smooth, light green. |
| 47..... | Medium tall, semi-erect, leaves attached at medium angles. | Latifoliate, base obtuse, auriculate. Tip acute-cucullate, surface smooth, light green. |
| 48..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate to latifoliate, base acute-auriculate. Tip acute to pointed, surface smooth, medium green. |
| 49..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate to latifoliate, base acute-auriculate. Tip acute to pointed, surface smooth, medium green. |
| 57..... | Medium tall, semi-erect, leaves attached at wide angles. | Latifoliate, base obtuse, slightly auriculate. Tip semi-acute, surface smooth, light green. |
| 58..... | Medium tall, semi-erect, leaves attached at wide angles. | Latifoliate, base obtuse, slightly auriculate. Tip semi-acute, surface smooth, light green. |
| 61..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base semi-acute slightly auriculate. Tip semi-acute, surface slightly rough, light green. |
| <i>Group 3—Orinoco—</i> | | |
| 34..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, definitely auriculate, tip sharply acute, surface slightly rough, medium green. |
| 36..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate to latifoliate, base sharply acute, slightly auriculate, tip acute to pointed, surface slightly rough, medium green. |
| 37..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate to latifoliate, base sharply acute, auriculate, tip acute, slightly cucullate, surface slightly rough, medium green. |
| 38..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base acute, auriculate, tip acute, slightly cucullate, surface smooth, light green. |
| 51..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base obtuse, slightly auriculate, tip sharply acute, slightly cucullate, surface slightly rough, medium green. |
| 52..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, slightly auriculate; tip acute to pointed, surface rough, medium green. |
| 59..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, tips sharply acute, surface slightly rough, medium green. |
| 62..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate to latifoliate, base sharply acute auriculate, tip acute to pointed, surface slightly rough, light green. |
| 64..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base acute auriculate, tip acute to sharply pointed and slightly cucullate, surface slightly rough, light green. |
| 65..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, auriculate, tips sharply acute, cucullate, surface slightly rough, light green. |

TABLE 2—DESCRIPTION OF GROWING PLANT AND GREEN LEAF—*Continued*

FLUE-CURED VARIETIES

| Serial Number | Plant | Leaf |
|----------------------------|--|---|
| <i>Group 4—Pryor—</i> | | |
| 13..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base obtuse, decidedly auriculate, tip sharply acute, decidedly cucullate, surface smooth, dark green. |
| 14..... | Medium tall, semi-erect, leaves attached at wide angles. | Latifoliate, base acute, auriculate, tip acute, slightly cucullate, surface medium smooth, light green. |
| 15..... | Medium tall, semi-erect, leaves attached at wide angles. | Latifoliate, base acute, auriculate, tip acute, slightly cucullate, surface medium smooth, light green. |
| 17..... | Medium tall, slightly drooping, leaves attached at wide angles. | Latifoliate, base acute, auriculate, tip sharply acute, slightly cucullate, surface fairly smooth, light green. |
| 18..... | Medium tall, slightly drooping, leaves attached at wide angles. | Latifoliate—broad, base acute, auriculate, tip acute, slightly cucullate, surface medium smooth, medium green. |
| 19..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base sharply acute, slightly auriculate, tip sharply acute, decidedly cucullate, surface smooth, medium green. |
| 53..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, slightly auriculate, tip sharply acute, slightly cucullate, surface slightly rough, medium green. |
| 55..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate—broad, base acute, tip sharply acute, decidedly cucullate, surface rough, light green. |
| 56..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base acute, auriculate, tip acute, cucullate, surface slightly rough, medium dark green. |
| 60..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Latifoliate, base acute, slightly auriculate, tip acute, cucullate, surface slightly rough, light green in colour. |
| <i>Group 5—Adcock—</i> | | |
| 21..... | Tall, semi-erect, leaves attached at medium narrow angles. | Latifoliate, base sharply acute, slightly auriculate, tip broadly acute, surface rough, medium green. |
| 22..... | Tall semi-erect, leaves attached at medium narrow angles. | Latifoliate, base sharply acute, slightly auriculate, tip broadly acute, surface rough, medium green. |
| 23..... | Tall, semi-erect, leaves attached at medium narrow angles. | Latifoliate, base sharply acute, slightly auriculate, tip broadly acute, surface rough, medium green. |
| 43..... | Tall, semi-erect, leaves attached at medium narrow angles. | Latifoliate, base acute, decidedly auriculate, tip acute, decidedly cucullate, surface very rough, medium green. |
| 45..... | Medium tall, semi-erect, leaves attached at medium wide angles. | Lanceolate to latifoliate, base sharply acute, auriculate, tip acute, cucullate, surface slightly rough, medium green. |
| <i>Group 6—Willow Leaf</i> | | |
| 25..... | Medium short, semi-erect, leaves attached at medium wide angles. | Stenophyllate, base acuminate, slightly auriculate, tip sharply acute, decidedly cucullate, surface rough, dark green. |
| 33..... | Medium short, semi-erect, leaves attached at medium wide angles. | Stenophyllate, base acuminate, slightly auriculate, tip sharply acute, decidedly cucullate, surface rough, dark green. |
| 39..... | Medium short, semi-erect, leaves attached at medium wide angles. | Stenophyllate, base acuminate, slightly auriculate, tip sharply acute, decidedly cucullate, surface rough, dark green. |
| 44..... | Medium short, semi-erect, leaves attached at medium wide angles. | Stenophyllate, base acuminate, slightly auriculate, tip sharply acute, decidedly cucullate, surface rough, dark green. |
| <i>Group 7—Pinkney—</i> | | |
| 16..... | Medium tall, very erect, leaves attached at acute angles. | Latifoliate, base obtuse, auriculate, tip bluntly acute, surface smooth, light green. |
| 50..... | Medium tall, very erect, leaves attached at acute angles. | Latifoliate, base obtuse, auriculate, tip bluntly acute, surface smooth, light green. |
| 63..... | Medium tall, very erect, leaves attached at acute angles. | Latifoliate, base obtuse, auriculate, tip bluntly acute, surface smooth, light green. |

TABLE 2—DESCRIPTION OF GROWING PLANT AND GREEN LEAF—*Concluded*
FLUE-CURED VARIETIES

| Serial Number | Plant | Leaf |
|---------------------------|--|---|
| <i>Group 8—Broadleaf—</i> | | |
| 20..... | Short and drooping, short internodes.... | Ovate, base obtuse, auriculate, tip acute, surface smooth, dark green. |
| 31..... | Medium short, drooping, short internodes, many leaves. | Ovate, base obtuse, auriculate, tip acute, surface smooth, medium light green. |
| 42..... | Medium short, semi-drooping, short internodes. | Ovate, base obtuse, auriculate, tip acute, surface smooth, medium light green. |
| <i>Group 9—Warne—</i> | | |
| 1..... | Medium short, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium green. |
| 2..... | Medium short, semi-erect..... | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium green. |
| 3..... | Medium short, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium green. |
| 4..... | Medium short, semi-erect, leaves attached at medium wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium green. |
| 5..... | Medium tall, semi-erect, leaves attached at fairly wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium green. |
| 6..... | Medium tall, semi-erect..... | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium green. |
| 24..... | Medium short, semi-erect, leaves attached at medium narrow angles. | Lanceolate, base sharply acute, auriculate, tip acute, decidedly cucullate, surface slightly rough, dark green. |
| 30..... | Medium tall, semi-erect, leaves attached at wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium light green. |
| 32..... | Medium tall, semi-erect, leaves attached at wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium light green. |
| 40..... | Medium tall, semi-erect, leaves attached at wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium dark green. |
| 41..... | Medium tall, semi-erect, leaves attached at wide angles. | Lanceolate, base sharply acute, auriculate, tip sharply acute, cucullate, surface slightly rough, medium light green. |

(c) Relative Maturity

During 1930 and 1931 a uniform number of plants from all varieties was harvested by the stalk-cut method. Since that time, the priming method of harvesting has been adopted. In the first case, the whole plant was cut and cured 30 to 35 days after topping, while in the second case, the leaves alone were picked or primed as they ripened. The more recent method necessitated three to four primings. The first priming usually was made 12 to 17 days after topping. The second, third and fourth primings followed at intervals of 6 to 10 days. The priming method of harvesting extended the harvesting operations over a wider period.

In relation to maturity, certain varieties showed considerable variation between the time they were topped and the time the first leaves gave signs of maturity. Some varieties came into maturity more rapidly and more uniformly than others. The taller and more erect-growing varieties showed earlier signs of maturity. after topping, than the more drooping broadleaf varieties. Varieties

that yellowed normally 15 to 20 days after topping were usually well adapted for priming. On the other hand, those that remained green 25 to 30 days, after topping, were not considered good priming varieties. The first priming from the later maturing varieties usually showed a greyish green cast or a nondescript green when cured. The later primings of the later varieties usually were quite difficult to cure as the harvesting season advanced.

Data on relative maturity are presented in Table 3.

TABLE 3.—MATURITY DATA—FLUE-CURED

| Serial No. | Number of days from Transplanting to | | | Number of days from topping to harvest | | | | | | |
|-----------------|---|---------|----------------|---|-----|-----|-------|------|-----|-------|
| | First bud | Topping | First bloom | 1932 | | | | 1933 | | |
| | | | | (1) | (2) | (3) | (4) | (1) | (2) | (3) |
| <i>Group 1—</i> | | | | | | | | | | |
| 26..... | 50 | 55 | 59 | 17 | 20 | 34 | 48 | 12 | 25 | 41 |
| 27..... | 54 | 55 | 63 | 17 | 20 | 34 | 48 | 12 | 25 | 41 |
| 28..... | 50 | 55 | 59 | 17 | 20 | 34 | 48 | 12 | 25 | 41 |
| 29..... | 50 | 55 | 59 | 17 | 20 | 34 | 48 | 12 | 25 | 41 |
| 54..... | 50 | 55 | 61 | 17 | 20 | 34 | 48 | 15 | 28 | 44 |
| <i>Group 2—</i> | | | | | | | | | | |
| 35..... | 54 | 56 | 63 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 46..... | 54 | 56 | 63 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 47..... | 50 | 56 | 63 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 48..... | 50 | 58 | 61 | 17 | 20 | 34 | 48 | 18 | 31 | 46 |
| 49..... | 50 | 58 | 63 | 17 | 20 | 34 | 48 | 18 | 31 | 46 |
| 57..... | 44 | 56 | 61 | 17 | 20 | 34 | 48 | 22 | 37 | 46 |
| 58..... | 54 | 58 | 63 | 17 | 20 | 34 | 48 | 22 | 37 | 46 |
| 61..... | 50 | 58 | 57 | | | | | 18 | 31 | 46 |
| <i>Group 3—</i> | | | | | | | | | | |
| 34..... | 54 | 56 | 57 | 17 | 20 | 34 | 48 | 31 | 38 | 57 |
| 36..... | 54 | 56 | 57 | 17 | 20 | 34 | 48 | 31 | 38 | 59 |
| 37..... | 54 | 56 | 59 | 17 | 20 | 34 | 48 | 31 | 38 | 57 |
| 38..... | 54 | 56 | 57 | 17 | 20 | 34 | 48 | 31 | 38 | 57 |
| 51..... | 54 | 56 | 63 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 52..... | 54 | 56 | 61 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 59..... | 54 | 56 | 57 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 62..... | 50 | 56 | 57 | | | | | 18 | 31 | 46 |
| 64..... | 50 | 56 | 57 | | | | | 18 | 31 | 46 |
| 65..... | 46 | 58 | 57 | | | | | 18 | 31 | 40 |
| <i>Group 4—</i> | | | | | | | | | | |
| 13..... | 54 | 56 | 63 | 17 | 20 | 34 | 48 | 31 | 38 | 57 |
| 14..... | 54 | 56 | 61 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 15..... | 54 | 56 | 61 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 17..... | 50 | 56 | 52 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 18..... | 50 | 56 | 57 | 17 | 20 | 34 | 48 | 31 | 38 | 57 |
| 19..... | 50 | 56 | 57 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 53..... | 54 | 61 | 61 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 55..... | 59 | 61 | 63 | 17 | 20 | 34 | 48 | 31 | 38 | 57 |
| 56..... | 54 | 61 | 63 | 17 | 20 | 34 | 48 | 22 | 37 | 56 |
| 60..... | 46 | 58 | 57 | | | | | 18 | 31 | 40 |
| <i>Group 5—</i> | | | | | | | | | | |
| 21..... | 50 | 56 | 59 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 22..... | 50 | 56 | 59 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 23..... | 50 | 56 | 57 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 43..... | 54 | 56 | 57 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 45..... | 50 | 56 | 57 | 17 | 20 | 34 | 48 | 22 | 37 | 46 |
| <i>Group 6—</i> | | | | | | | | | | |
| 25..... | 54 | 57 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 46 |
| 33..... | 50 | 56 | 59 | 17 | 20 | 34 | 48 | 22 | 37 | 46 |
| 39..... | 54 | 56 | 63 | 17 | 20 | 34 | 48 | 22 | 37 | 46 |
| 44..... | 54 | 56 | 63 | 17 | 20 | 34 | 48 | 31 | 38 | 57 |
| <i>Group 7—</i> | | | | | | | | | | |
| 16..... | 54 | 56 | 63 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 50..... | 54 | 59 | 59 | 17 | 20 | 34 | 48 | 18 | 31 | 40 |
| 63..... | 54 | 56 | 61 | | | | | 18 | 31 | 40 |
| <i>Group 8—</i> | | | | | | | | | | |
| 20..... | 54 | 57 | 57 | 20 | 34 | 48 | ..... | 36 | 43 | ..... |
| 31..... | 54 | 57 | 57 | 20 | 34 | 48 | ..... | 36 | 43 | ..... |
| 42..... | 54 | 57 | 57 | 20 | 34 | 48 | ..... | 36 | 43 | ..... |

TABLE 3.—MATURITY DATA—FLUE-CURED—*Concluded*

| Serial No. | Number of days from transplanting to | | | Number of days from topping to harvest | | | | | | |
|-----------------|--------------------------------------|---------|-------------|--|-----|-----|-------|------|-----|-----|
| | First bud | Topping | First bloom | 1932 | | | | 1933 | | |
| | | | | (1) | (2) | (3) | (4) | (1) | (2) | (3) |
| <i>Group 9—</i> | | | | | | | | | | |
| 1..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 46 |
| 2..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 31 | 38 | 57 |
| 3..... | 54 | 58 | 57 | 20 | 34 | 48 | ..... | 31 | 38 | 57 |
| 4..... | 54 | 58 | 57 | 20 | 34 | 48 | ..... | 31 | 38 | 57 |
| 5..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 46 |
| 6..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 56 |
| 24..... | 54 | 58 | 59 | 20 | 34 | 48 | ..... | 22 | 37 | 56 |
| 30..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 56 |
| 32..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 56 |
| 40..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 56 |
| 41..... | 46 | 58 | 57 | 20 | 34 | 48 | ..... | 22 | 37 | 56 |

(d) Relative Merits, Yield and Grade Index

Although the grouping of the varieties of the flue-cured type was dependent mainly upon the field growth characteristics and resemblances some regard was also given the quality data. Grade index values, as indicative of quality, were quite important factors in placing any particular variety in a specific group. The merits of these varieties, with yield and quality data as a basis, are presented below.

GROUP 1—CASH

A very narrow difference was noted in the yield and quality range of the various strains and varieties in this group. The Cash strains were apparently very uniform. All were well adapted for priming.

Cash (26, 27, 28, 29) carried less body in the leaf than *Jamaica Wrapper* (54) and was inclined to sponge very easily during the process of curing. It was also subject to wind bruising in the field. It produced a fair cigarette quality of leaf and usually was adapted best to the heavier types of flue-cured soils.

Jamaica Wrapper (54) although fairly widely grown, was adapted particularly to the medium light flue-cured soils. Its leaf was more pointed than Cash and cured more easily. The cured leaf was quite readily distinguished by its characteristic deep orange colour. *Jamaica Wrapper* had a more oily texture and finish than Cash.

GROUP 2—VIRGINIA

The best flue-cured cigarette varieties were included in Group 2. They were all considered good priming tobaccos and the quality produced was above the average. *Bonanza* and *Virginia Bright* gave the highest average grade index. *Harrison's Special* and *Yellow Mammoth* were added to the group in 1931, and *White Mammoth* in 1933.

White Stem Orinoco (35) was placed in this group as a result of its resemblances to these varieties. This strain matured earlier than other *White Stem Orinoco* strains, and also produced a fairly broad, smooth leaf.

Bonanza (46, 47) grew semi-erect in the field. The leaves were medium broad, pointed at the tips, light green in colour, smooth, with fine fibres, and usually found easy to cure. *Bonanza* matured early and was capable of pro-

ducing a high percentage of fine, bright cigarette cutters. It is a popular variety in the old belt (Essex County). Two strains were included in the test. The Georgia Strain (47) from the North Carolina Experiment Station proved slightly superior to the Bowling Green, Va. Strain (46).

Virginia Bright (48, 49), of which there are two strains, was included in Group 2. Strain No. 49 originated from North Carolina and strain No. 48 from Bowling Green, Va. Both strains were apparently true to type as far as field growth was concerned, but varied slightly in yield and grade value. *Virginia Bright* produced an excellent bright colour but the veins of the leaf were prominent with some tendency towards a brittle, coarse texture. *Virginia Bright* produced a longer and more pointed leaf than the other varieties in this group.

Harrison's Special (57) was secured from a tobacco plantation in Delhi in 1931. This variety was a heavier yielder than *Bonanza* and also produced very good quality. It possessed the same type of leaf as *Yellow Mammoth* (58) but was slightly broader and more rounded at the tip than *Bonanza*. *Harrison's Special* was easy to cure, and also considered a good priming variety.

Yellow Mammoth (58) in some respects resembled *Harrison's Special* in the field but failed to give as good quality when cured. It also suffered slightly more from the drought than the other varieties in Group 2. *Yellow Mammoth* was especially well-adapted to the more fertile flue-cured soils, and it is, at present, grown extensively.

White Mammoth (61) was obtained from a local tobacco grower in the new belt (Norfolk district) in 1933. It grew more erect than *Yellow Mammoth* and also matured a few days earlier. It produced a fine, medium smooth, bright leaf of good cigarette quality and at the present time is extensively grown in the Norfolk district.

GROUP 3—ORINOCO

Most of the varieties in this group rated slightly lower in yield and quality than the varieties in Group 2. These strains are best adapted to the lighter sandy soils. They were erect in habit of growth and are fairly suitable for priming especially when grown on the lighter sandy soils.

Little Orinoco (34) was obtained from Bowling Green, Va. in 1930. It produced a small narrow leaf and matured late. The quality and yield of this variety were below the average of the group. It was not well adapted for priming.

White Stem Orinoco (36, 37, 64) is grown quite extensively in the new belt (Norfolk district) and is apparently well-adapted to the lighter flue-cured soils. The strains in this group were sensitive to wind bruising, and also were found more difficult to cure than the average flue-cured varieties.

Yellow Orinoco (38) is characterized in the field by its light green coloured leaf. It, otherwise, resembled *White Stem Orinoco* (35) in habit of growth. *Yellow Orinoco* matured late and had a tendency to sponge easily during the curing process. It was also a light yielder.

Jamaica (51) is apparently a different variety from the variety known as *Jamaica Wrapper* (54) which was included in Group 1. It produced a shorter, broader leaf, more rounded at the base, and was also later-maturing. The quality obtained from *Jamaica* (51) was better suited for pipe cutters, being slightly dark in colour for cigarette purposes.

Gold Tip (52) may be recognized in the field by its medium long, somewhat club-shaped, crinkly-surfaced leaf. The cured leaf was medium bright, inclined to be thick, and not especially desirable for cigarette purposes. *Gold Tip* was more suitably adapted to the lighter sandy flue-cured soils.

White Stem Willow Leaf (59) under suitable field conditions, produced a bright leaf, lemony-orange in colour and fine in texture. When compared with varieties in Group 2, however, it matured considerably later. *White Stem Willow Leaf* is fairly satisfactory as a priming tobacco when planted on the lighter flue-cured sandy soils.

White Stem Mammoth (62) was obtained from a tobacco grower in the new belt in 1933. This strain matured somewhat earlier than the other Orinoco varieties in Group 3. It was a good yielder and produced an average cigarette quality leaf. *White Stem Mammoth* has a medium long, narrow leaf and is well adapted for priming.

White Stem Pearl (65) was obtained from a grower in Elgin County. It matured early and was quite well adapted for priming.

GROUP 4—PRYOR

The varieties in this group belong to what is known as the "Pryor" type, characterized in the early growth stage by the smooth, glossy appearance of the leaf. There were three strains of Hickory Pryor and two of Yellow Pryor. Considerable variation was noted among them. The Harrow Station strains showed some superiority in both yield and quality over the imported strains. Most of the varieties produced a relatively large thin leaf, which cured a reasonably bright colour but lacked the fine finish and texture necessary for good cigarette tobacco.

Hickory Pryor (13, 14, 15) is a fairly well known variety. It was grown extensively on the medium heavy sandy soils when flue-cured tobacco was harvested by the stalk-cut method, but has been replaced, recently, by more suitable varieties. Strain 13 produced a leaf darker in colour and more rounding at the base than the other strains. All possessed a medium broad, long leaf with a pointed tip. They were usually easy to cure when harvested at the proper stage of maturity but, if left standing too long, after topping, the cured leaf usually became woody in texture.

Yellow Pryor (17, 18) is a strain differing from the Yellow Pryor, well-known to growers of dark tobacco. It resembled Hickory Pryor in habit of growth, was a good yielder, and cured a fairly bright orange colour of medium cigarette quality. The Harrow Strain (17) was superior to the imported strain (18).

Yellow Bud Pryor (19) is a variety also differing distinctly from the other Pryor strains. It was very much lighter in colour and the leaves tapered more at the base. It produced a heavy-bodied leaf.

Nancy's Best (53) was also a pioneer among flue-cured tobacco varieties, and could not be considered a good priming variety. It produced a medium long, narrow, thick leaf, falling in a class of tobacco best suited for pipe smoking.

Silk Leaf (55) resembled Hickory Pryor except that the leaves possessed a slightly ruffled surface. *Silk Leaf* was difficult to cure and produced a quality of leaf more suitable for pipe smoking.

Conqueror (56) was one of the pioneer flue-cured tobacco varieties and usually more adapted for stalk-cutting. It produced a dark orange, heavy-bodied leaf suitable for wrapper and pipe cutters. In habit of growth it was medium tall and semi-erect.

Charlie's Special (60) was obtained from a grower in Elgin County in 1933. It proved to be an early maturing, vigorous growing variety, but the quality of the cured leaf was found to be slightly below the average of that produced by the better cigarette priming varieties.

GROUP 5—ADCOCK

Although the varieties in Group 5 resembled each other in field growth, there was considerable variation in yield and quality. The strain of Adcock (23) from North Carolina Experiment Station gave a lighter yield and was consistently poorer in quality than the Harrow (21) and Bowling Green (22) strains. The varieties in this group produced a low percentage of leaf suitable for cigarette purposes. The leaf was difficult to cure and lacked both colour and texture.

Adcock (21, 22, 23) is a fairly tall-growing variety quite well known to the older flue-cured growers. It is not grown to any extent at the present time owing to its inability to produce a good quality cigarette tobacco. The leaf was medium short and in certain cases was found to be woody in texture.

Banana Leaf (43) is not widely adapted. It is recognized in the field by its somewhat ruffled leaf surface. The leaf is fairly thick and cures up a reddish orange colour.

Hester (45) is quite an old flue-cured variety. It grows more erect than *Banana Leaf*, and possesses a slightly smaller leaf. *Hester* is not widely grown at the present time. Due to its tendency to produce a fairly thick leaf it is possibly best adapted to the lighter flue-cured sandy soils.

GROUP 6—WILLOW LEAF

The varieties in this narrow leaf group, fall more or less into a pipe-smoking class of tobacco. Their tendency towards a thick, waxy texture and low orange colour, lowered their grade value for cigarette tobaccos.

Lizzard Tail (25) was considered the best narrow leaf variety in Group 6. It cured a fairly uniform orange colour and produced a good quality wrapper leaf. This variety became established when flue-cured tobacco was harvested by the stalk-cut method.

Big Orinoco (33) produced an even smaller leaf than the other varieties mentioned in this group. The leaf was difficult to cure. This variety was not considered suitable for priming.

Narrow Leaf Orinoco (39) was more drooping in habit than *Willow Leaf*, and possessed a slightly broader and shorter leaf. It cured a dull orange colour and was not well adapted for priming.

Willow Leaf (44) and the *White Stem Willow Leaf* (59) under Group 3 are distinctly different varieties. *Willow Leaf* (44) produced a narrower, thicker leaf of inferior quality than *White Stem Willow Leaf* and was not considered a good priming variety. *Willow Leaf* matured later than the other varieties in Group 6.

GROUP 7—PINKNEY

The varieties in Group 7 matured early, produced good yields and were suitable for priming. The cured leaf from these varieties, although bright in colour, was inclined to be coarse and slightly brittle.

Harrison's Pryor (16) was secured from the North Carolina Experiment Station. It resembled Pinkney Arthur in practically every detail, and was evidently a similar selection.

Pinkney Arthur (50) was obtained originally from Bowling Green, Va. The leaf cured easily, but the texture was slightly coarse for cigarette purposes.

Yellow Warne (63) was distinctly different from the well-known variety Warne (Group 9). It was secured in 1933 from a grower in Norfolk County. This variety matured early and was apparently well suited for priming. The cured leaf, however, was too dark in colour for cigarette purposes, yielding a high percentage of mahogany coloured leaf.

GROUP 8—BROADLEAF

The average yield of these drooping broadleaf varieties was high. The grade value was generally low, indicating a quality of leaf not particularly suitable for cigarette purposes.

Blue Pryor (20) also was secured from Bowling Green, Va. It could be readily distinguished in the field by its short drooping leaves of a characteristic bluish green colour. Blue Pryor matured late and was not considered a desirable variety for Ontario conditions. The quality of the cured leaf was poor.

Gold Leaf (31) more commonly known as Big Gold Leaf, is a distinct broadleaf strain. Other strains of Gold Leaf are listed under Group 9. Strain (31) resembled the Burley type of tobacco in habit of growth. The internodes were short and the plants produced more leaves than other varieties. Gold Leaf grew more erect than Broadleaf Gooch and Blue Pryor. The leaves were smooth, light green in colour, and cured a medium bright colour. The texture of the leaf, however, was inclined to be coarse and brittle.

Broad Leaf Gooch (42) was obtained originally from Bowling Green, Va. This variety produced a very poorly finished reddish leaf. It was a week to ten days later maturing than the standup broadleaf varieties in Group 7.

GROUP 9—WARNE

This group is characterized by high yielding varieties. Considerable variation occurred in the quality of the cured leaf. The colour varied from a bright lemony-orange to a cherry red or mahogany, and the leaf carried too much body to be classed as good cigarette tobacco, being more or less suitable for wrappers. The majority of the varieties in this group were not particularly satisfactory for priming, but gave good results when handled under the stalk-cut method of harvesting. The varieties in this group gave best results when grown on the lighter flue-cured soils.

Warne (1, 2, 3, 4, 5, 6) until recently was grown very extensively. Previous to 1930 at least 90 per cent of the flue-cured tobacco grown was of this variety. This group includes several different strains of Warne all of which were fairly uniform. The strain Schlossen (5) was slightly more erect in habit of growth and matured earlier than the other strains. The majority of the Warne strains produced a thick leaf, and, when harvested by the priming method, the backs of the leaves, after curing, frequently had a greyish green cast.

Lizzard Tail Orinoco (24) and *Lizzard Tail* described in Group 6 are distinctly different strains. Strain (24) had a thicker, broader leaf and produced a quality leaf consistently poorer than strain No. 25.

Gold Leaf (30, 32) in some respects resembled *Warne*. It could be distinguished in the field, however, by its lighter green colour and slightly taller growth. The Improved *Gold Leaf Strain* (32), from Bowling Green, Va., yielded less but produced a better quality of leaf than the Imperial Tobacco Company Strain (30). *Gold Leaf* is not especially well adapted for priming. Its heavy-bodied leaf is better suited for pipe tobacco than for cigarette purposes.

Wildfire Resistant Orinoco (40) originated from Bowling Green, Va., and except for its slightly darker shade of green it is quite similar to *Warne* in appearance. The cured leaf ranged in colour from a dark orange to mahogany. A considerable quantity of the leaf could be classed as wrappers. *Wildfire Resistant O.* was not considered a good variety for priming.

Long Leaf Gooch (41) bears no similarity to *Broadleaf Gooch* listed in Group 8; it is earlier maturing and grows taller. *Long Leaf Gooch* cured a reddish orange colour and resembled *Warne* in many respects. It is best suited for the production of pipe tobacco.

In Table 4 is presented description of cured leaf, yield and grade index of individual varieties.

TABLE 4—QUALITY, YIELD AND GRADE INDEX

FLUE-CURED VARIETIES

| Serial Number | Cured leaf qualities | Average yield | Grade index average |
|--------------------------|---|---------------|---------------------|
| <i>Group 1—Cash—</i> | | | |
| 26..... | Orange, slightly sponged, fine smooth texture, thin short and sweet. Cigarette type—good grade. | lb. 1,228 | 21.8 |
| 27..... | Orange, slightly sponged, fine smooth texture, thin short and sweet. Cigarette type—good grade. | 1,217 | 22.6 |
| 28..... | Orange, slightly sponged, fine smooth texture, thin short and sweet. Cigarette type—good grade. | 1,221 | 21.8 |
| 29..... | Orange, slightly sponged, fine smooth texture, thin short and sweet. Cigarette type—good grade. | 1,247 | 22.6 |
| 54..... | Bright orange, greenish back, fine smooth oily texture, medium size, medium body—sweet, cigarette type—good. | 1,291 | 21.8 |
| <i>Group 2—Virginia—</i> | | | |
| 35..... | Bright orange, fine smooth venation and texture, sweet aroma, medium thin body, medium size. Cigarette—good grade. | 1,365 | 23.9 |
| 46..... | Lemon, fine smooth texture, medium size, thin, sweet, very good. Cigarette type. | 1,341 | 24.6 |
| 47..... | Lemon, fine smooth texture, medium size, thin, sweet, very good. Cigarette type. | 1,358 | 26.5 |
| 48..... | Lemon, medium coarse venation, slightly brittle texture, mild aroma, medium long. Cigarette type—good. | 1,401 | 25.9 |
| 49..... | Lemon, medium coarse venation, slightly brittle texture, mild aroma, medium long. Cigarette type—good. | 1,554 | 22.9 |
| 57..... | Lemon, fine smooth texture, medium size, thin, sweet, very good. Cigarette type. | 1,555 | 24.2 |
| 58..... | Lemon, fine smooth texture, medium size, thin, sweet, very good. Cigarette type. | 1,554 | 22.2 |
| 61..... | Lemon, fine smooth texture, medium size, thin, sweet, very good. Cigarette type. | 1,437 | 21.5 |
| <i>Group 3—Orinoco—</i> | | | |
| 34..... | Medium orange-greenish cast, medium body, fairly fine smooth texture and venation, short, sweet. | 1,267 | 15.9 |
| 36..... | Medium orange, fine, fairly smooth venation and texture, sweet aroma, medium body, medium small size. Cigarette—medium grade. | 1,295 | 22.3 |
| 37..... | Medium orange, slightly sponged, fine medium smooth texture, medium body, medium short, mild, fair quality. Cigarette type—low grade. | 1,256 | 18.1 |

TABLE 4—QUALITY, YIELD AND GRADE INDEX—*Continued*

FLUE-CURED VARIETIES

| Serial Number | Cured leaf qualities | Average yield | Grade index, average |
|------------------------------|--|---------------|----------------------|
| <i>Group 3—Orinoco—Conc.</i> | | lb. | |
| 38..... | Medium orange, slightly sponged, medium fine texture and venation, medium body, medium short, mild, fair quality. Cigarette—low grade. | 1,213 | 18.6 |
| 51..... | Orange-greenish cast, medium fine smooth texture, fairly thin, medium size, sweet. Cigarette—medium grade. | 1,395 | 18.6 |
| 52..... | Orange-greenish cast, fine smooth venation and texture, sweet aroma, medium body, medium size. Cigarette—medium grade. | 1,385 | 22.5 |
| 59..... | Bright orange-greenish cast, medium fine smooth texture and venation, medium body and size. Medium cigarette type—good. | 1,409 | 23.2 |
| 62..... | Good orange colour, medium fine smooth texture and venation medium body, medium size, sweet. Cigarette—good. | 1,424 | 21.7 |
| 64..... | Lemony orange colour, fine smooth texture, fairly long, medium body, sweet. Cigarette—very good. | 1,448 | 20.3 |
| 65..... | Bright orange to rich mahogany, medium fine smooth texture, medium, thick body, sweet aroma. Medium. Cigarette—good. | 1,425 | 20.5 |
| <i>Group 4—Pryor—</i> | | | |
| 13..... | Low orange, greenish cast, medium fine smooth venation, texture slightly brittle, body thick, small undersized leaf, neutral aroma. Low cigarette—poor. | 1,332 | 12.4 |
| 14..... | Orange, slight greenish cast, medium fine venation and texture, medium size, medium body, mild, medium quality. Cigarette—medium. | 1,410 | 21.0 |
| 15..... | Medium orange, greenish cast, medium fine venation, fairly smooth texture, medium size, medium body, mild, fair quality. Cigarette—low grade. | 1,312 | 19.1 |
| 17..... | Bright orange, venation slightly prominent, texture slightly brittle, medium small thin leaf, mild. Cigarette—good. | 1,511 | 23.5 |
| 18..... | Dark orange, greenish cast, venation medium fine, texture lacking grain, thin body, mild. Pipe smoking—poor. | 1,189 | 17.4 |
| 19..... | Bright orange, greenish cast, venation slightly prominent, texture slightly brittle, thin, mild. Cigarette—good. | 1,460 | 22.1 |
| 53..... | Medium orange, medium fine venation and texture, body medium, sweet aroma. Cigarette—fair. | 1,323 | 20.6 |
| 55..... | Low orange, greenish cast, slightly prominent venation, texture brittle, lacking finish, body thick, neutral aroma. Pipe smoking—fair. | 1,322 | 20.0 |
| 56..... | Medium orange, greenish cast, venation and texture medium fine and smooth, body medium thick, sweet aroma. Pipe smoking—fair. | 1,547 | 18.7 |
| 60..... | Medium orange to mahogany, medium thick fine texture, sweet aroma. Fair cigarette quality. | 1,575 | 15.9 |
| <i>Group 5—Adcock—</i> | | | |
| 21..... | Dark orange to mahogany, venation prominent, texture brittle and coarse, body medium, aroma toasted, short. Pipe smoking—fair. | 1,340 | 19.1 |
| 22..... | Dark orange to mahogany, venation prominent, texture brittle and coarse, body medium, aroma toasted, short. Pipe smoking—fair. | 1,324 | 18.9 |
| 23..... | Dark orange to mahogany, venation prominent, texture brittle and coarse, body medium, aroma toasted, short. Pipe smoking—fair. | 1,227 | 17.3 |
| 43..... | Orange, badly sponged, venation and texture fine and smooth, body medium thick, medium short, sweet aroma. Pipe smoking—fair. | 1,488 | 21.7 |
| 45..... | Low orange, badly sponged, texture and venation medium fine and smooth, body medium thick, sweet aroma, fair wrapper quality. Pipe smoking—medium. | 1,356 | 19.1 |
| <i>Group 6—Willow Leaf</i> | | | |
| 25..... | Medium orange, greenish cast, venation slightly prominent, texture fairly fine, fairly good wrapper quality, medium thick and stretchy, sweet, medium long. Pipe smoking—medium. | 1,316 | 22.3 |
| 33..... | Low orange, greenish cast, venation coarse and prominent, body thick and coarse, medium short, aroma sweet. Pipe smoking—fair. | 1,337 | 17.2 |

TABLE 4—QUALITY, YIELD AND GRADE INDEX—*Concluded*

FLUE-CURED VARIETIES

| Serial Number | Cured leaf qualities | Average yield | Grade index, average |
|---|--|---------------|----------------------|
| <i>Group 6—Willow Leaf</i> <i>—Cone.</i> | | lb. | |
| 39..... | Low orange, greenish cast, venation coarse and prominent, body thick and coarse, medium short, aroma sweet. Pipe smoking—fair. | 1,405 | 17.2 |
| 44..... | Dark orange, greenish cast, venation and texture medium, fine and smooth, body thick, medium length, fair wrapper quality, sweet aroma. Pipe smoking—medium. | 1,406 | 18.0 |
| <i>Group 7—Pinkney—</i> | | | |
| 16..... | Medium orange, greenish cast, venation coarse, texture brittle, body medium thin, medium size, pleasant aroma. Pipe smoking—good. | 1,518 | 22.0 |
| 50..... | Medium orange, greenish cast, venation coarse, texture brittle, body medium thin, medium size, pleasant aroma. Pipe smoking—good. | 1,547 | 23.0 |
| 63..... | Medium orange to mahogany, venation slightly coarse, texture brittle, medium body and size, pleasant aroma. Pipe smoking—good. | 1,485 | 16.5 |
| <i>Group 8—Broadleaf—</i> | | | |
| 20..... | Low orange, venation and texture coarse and brittle, large leaf. Pipe quality—poor. | 1,627 | 14.7 |
| 31..... | Orange with greenish cast, venation and texture coarse and brittle, large leaf, medium thin, mild aroma. Pipe quality—fair. | 1,691 | 15.1 |
| 42..... | Low orange to red, greenish cast, venation and texture medium coarse and brittle, medium size, medium thin, mild aroma. Pipe quality—fair. | 1,422 | 16.6 |
| <i>Group 9—Warne—</i> | | | |
| 1..... | Medium orange, greenish cast, slightly coarse texture and venation, medium thick leaf wrapper quality, medium long, pleasant aroma. Pipe quality—fair. | 1,520 | 22.1 |
| 2..... | Bright orange, greenish cast, medium fine texture and venation, medium thick leaf, medium size, pleasant aroma. Pipe quality—good. | 1,470 | 20.1 |
| 3..... | Medium orange, greenish cast, medium fine venation and texture, medium thick body wrapper quality, medium long, pleasant aroma. Pipe quality—fair. | 1,368 | 20.4 |
| 4..... | Medium orange, greenish cast, medium fine venation and texture, medium thick body, wrapper quality, medium long, pleasant aroma. Pipe quality—fair. | 1,462 | 20.5 |
| 5..... | Bright orange, greenish cast, medium fine texture and venation, medium thick wrapper quality, long, sweet aroma. Pipe quality—good. | 1,482 | 22.8 |
| 6..... | Medium orange, greenish cast, medium fine venation and texture, medium thick body wrapper quality, medium long, pleasant aroma. Pipe quality—fair. | 1,583 | 20.3 |
| 24..... | Dark, orange medium fine smooth texture, medium thick, long, pleasant aroma. Pipe quality—fair. | 1,636 | 16.5 |
| 30..... | Medium orange, greenish cast, medium fine texture and venation, medium thick, medium size, pleasant aroma. Pipe quality—fair. | 1,599 | 19.0 |
| 32..... | Medium orange to mahogany, medium fine texture and venation, medium thick body, medium size, pleasant aroma. Pipe quality—good. | 1,486 | 21.4 |
| 40..... | Dark orange to mahogany, fine smooth texture and venation, medium thick, medium long, pleasant aroma. Pipe quality—medium. | 1,467 | 19.6 |
| 41..... | Dark orange, greenish cast veins, medium fine texture and venation, medium thin, long, pleasant aroma. Pipe quality—medium. | 1,470 | 18.4 |

(e) Brief Discussion

A total of fifty-nine varieties of the flue-cured type was included in this section of the test. Several of the more outstanding have merited selection from this number and are classified below according to maturity, quality of cured leaf and soil adaptability. The varieties which have been temporarily eliminated and not included below have not proven sufficiently promising to meet market requirements.

CLASS A.—EARLY MATURING FLUE-CURED VARIETIES

| Variety | Relative cigarette quality | Soil adaptation |
|----------------------------------|----------------------------|--|
| Bonanza (46)..... | High..... | Medium to heavy flue-cured soils (widely adapted). |
| Virginia Bright (48 and 49)..... | High..... | Medium light soils. |
| White Stem Pearl (65)..... | Intermediate.... | Medium light soils. |
| Jamaica wrapper (54)..... | Intermediate.... | Light sandy soils. |

CLASS B.—MEDIUM EARLY MATURING FLUE-CURED VARIETIES

| | | |
|------------------------------|-----------|-----------------------------------|
| Yellow Mammoth (58)..... | High..... | Medium to heavy flue-cured soils. |
| White Mammoth (61)..... | High..... | Medium to heavy flue-cured soils. |
| White Stem Orinoco (35)..... | High..... | Medium to light flue-cured soils. |

CLASS C.—MEDIUM LATE MATURING FLUE-CURED VARIETIES

| | | |
|----------------------------------|------------------|-------------------------|
| White Stem Willow Leaf (59)..... | Intermediate.... | Light flue-cured soils. |
| Gold Tip (52)..... | Low..... | Light flue-cured soils. |

CLASS D.—LATE MATURING FLUE-CURED VARIETIES

| | | |
|------------------------|----------|-------------------------|
| Warne (5)..... | Low..... | Light flue-cured soils. |
| Lizzard Tail (25)..... | Low..... | Light flue-cured soils. |
| Gold Leaf (30)..... | Low..... | Light flue-cured soils. |

The varieties in Class A, B and C are apparently well adapted for priming chiefly because of their taller habit of growth. The varieties in class D produced a thick, waxy type of leaf comparatively bright in colour, suitable for use in pipe tobaccos. Furthermore, their slightly drooping habit of growth renders these varieties less suitable for priming, hence they remain essentially as stalk-cut varieties.

Obviously the adaptability of any flue-cured variety to the soil is affected greatly by such factors as seasonal variation, fertilization and general soil conditions.

IX. BURLEY VARIETIES

(a) Field Growth Measurements

The field measurements taken on the Burley varieties were similar to those obtained from the flue-cured varieties. At topping time it was noted that the Burley varieties averaged from 4 to 6 inches shorter in height than the flue-cured varieties. This difference in height was maintained when the plants were topped. The number of harvestable leaves was very uniform throughout the series, and was usually found to be one more than that on flue-cured varieties, providing the latter varieties were topped for stalk-cutting.

With the greater number of leaves on a shorter stalk the length of internodes was obviously somewhat shorter. It necessarily followed that the leaves of the varieties of this type of tobacco were closer together on the stalk. Similar to other varieties the length of internode was found to be quite uniform throughout the entire length of the stalk. Although the general appearance of the plant might indicate that there was a greater crowding of the leaves at the top of the plant than at the bottom, there were ground leaves at the base of practically all plants, which were not considered in determining the number of potential harvestable leaves.

The leaf length and width were considerably greater than that of the flue-cured varieties. The average leaf index was also greater. This indicated a greater increase in leaf width than in leaf length. Owing to a very poor growing season, the data resulting from the measurements obtained for only one year were somewhat irregular.

In Table 5 are presented the Field Growth Measurements for the Burley varieties.

TABLE 5.—FIELD GROWTH MEASUREMENTS

BURLEY VARIETIES

| Number of variety | Plant | | | | Stalk | | Leaf | | |
|-------------------|----------------|--------|-----------------------|--------|----------------------|--------|--------|-------|----------------|
| | Average height | | Average number leaves | | Length of internodes | | Length | Width | Index |
| | Not topped | Topped | Not topped | Topped | Not topped | Topped | | | |
| | in. | in. | | | in. | in. | in. | in. | |
| 311 (1)..... | 29.7 | 22.0 | 17.3 | 13.6 | 1.5 | 1.6 | 22.1 | 11.9 | 54.1 |
| 322 (1)..... | 31.9 | 20.6 | 18.4 | 13.0 | 1.7 | 1.6 | 21.6 | 11.3 | 52.0 |
| 323 (1)..... | 35.6 | 24.6 | 20.5 | 13.8 | 1.7 | 1.8 | 21.4 | 11.7 | 54.6 |
| 335 (1)..... | 29.5 | 22.2 | 20.8 | 13.8 | 1.5 | 1.6 | 18.2 | 9.5 | 52.3 |
| 336 (1)..... | 31.1 | 23.1 | 18.9 | 13.6 | 1.7 | 1.7 | 20.4 | 11.1 | 54.4 |
| 337 (1)..... | 32.1 | 23.0 | 20.3 | 13.6 | 1.6 | 1.7 | 20.7 | 11.1 | 54.0 |
| 338 (1)..... | 29.3 | 21.7 | 20.4 | 13.6 | 1.4 | 1.6 | 20.9 | 11.0 | 52.6 |
| 340 (1)..... | 35.3 | 24.5 | 19.3 | 13.7 | 1.8 | 1.8 | 20.5 | 11.4 | 55.6 |
| 342 (1)..... | 32.3 | 32.9 | 18.4 | 13.6 | 1.7 | 1.7 | 20.4 | 11.8 | 58.0 |
| | 31.8 | 22.7 | 19.4 | 13.6 | 1.6 | 1.7 | 20.7 | 11.2 | 54.2 |
| 301 (2)..... | 31.9 | 24.3 | 17.9 | 13.5 | 1.8 | 1.8 | 21.1 | 12.0 | 57.0 |
| 302 (2)..... | 33.3 | 24.5 | 18.1 | 13.9 | 1.9 | 1.8 | 20.9 | 11.4 | 54.0 |
| 303 (2)..... | 31.9 | 23.8 | 18.6 | 13.8 | 1.9 | 1.7 | 20.9 | 11.9 | 56.6 |
| 304 (2)..... | 33.5 | 24.6 | 18.1 | 13.9 | 1.9 | 1.8 | 21.3 | 11.9 | 55.9 |
| 344 (2)..... | 40.1 | 27.6 | 17.1 | 13.4 | 2.3 | 2.1 | 21.6 | 11.4 | 52.8 |
| 345 (2)..... | 38.8 | 27.7 | 17.1 | 13.1 | 1.9 | 2.1 | 24.0 | 10.6 | 1 year 44.2 |
| | 34.9 | 25.4 | 17.8 | 13.7 | 2.0 | 1.9 | 25.1 | 11.5 | 53.4 |
| 305 (3)..... | 32.3 | 24.2 | 18.6 | 13.4 | 1.7 | 1.8 | 21.1 | 11.3 | 53.4 |
| 306 (3)..... | 34.2 | 24.7 | 18.6 | 13.8 | 1.8 | 1.8 | 21.7 | 11.5 | 52.9 |
| 307 (3)..... | 32.9 | 21.6 | 19.5 | 13.8 | 1.7 | 1.6 | 22.4 | 11.4 | 51.4 |
| 318 (3)..... | 32.7 | 23.3 | 19.1 | 13.7 | 1.7 | 1.7 | 22.0 | 11.3 | 51.3 |
| 343 (3)..... | 40.1 | 28.0 | 20.9 | 13.3 | 1.9 | 2.1 | 24.0 | 10.6 | 44.2 1 year |
| | 34.4 | 24.4 | 19.3 | 13.6 | 1.8 | 1.8 | 22.2 | 11.2 | 50.6 |
| 309 (4)..... | 31.4 | 20.5 | 19.7 | 13.9 | 1.6 | 1.5 | 22.8 | 11.0 | 48.6 |
| 310 (4)..... | 35.1 | 23.3 | 16.7 | 13.4 | 2.1 | 1.8 | 22.1 | 11.0 | 49.5 |
| 312 (4)..... | 29.5 | 20.3 | 19.5 | 13.4 | 1.5 | 1.5 | 22.9 | 12.5 | 55.0 |
| 315 (4)..... | 30.0 | 22.1 | 20.0 | 13.6 | 1.5 | 1.6 | 22.9 | 12.1 | 52.9 |
| 339 (4)..... | 31.8 | 23.3 | 20.4 | 13.7 | 1.6 | 1.7 | 22.0 | 11.7 | 54.2 |
| | 31.6 | 21.9 | 19.3 | 13.6 | 1.7 | 1.6 | 22.5 | 11.7 | 52.0 |

TABLE 5.—FIELD GROWTH MEASUREMENTS—*Concluded*

BURLEY VARIETIES

| Number of variety | Plant | | | | Stalk | | Leaf | | |
|-------------------|----------------|--------|-----------------------|--------|----------------------|--------|--------|-------|-------|
| | Average height | | Average number leaves | | Length of internodes | | Length | Width | Index |
| | Not topped | Topped | Not topped | Topped | Not topped | Topped | | | |
| | in. | in. | | | in. | in. | in. | in. | |
| 313 (5)..... | 27.3 | 20.0 | 20.0 | 13.7 | 1.4 | 1.5 | 23.0 | 10.9 | 47.5 |
| 314 (5)..... | 30.1 | 21.8 | 20.2 | 14.0 | 1.5 | 1.5 | 22.3 | 10.4 | 46.5 |
| 320 (5)..... | 36.6 | 23.1 | 20.0 | 13.9 | 1.8 | 1.6 | 24.1 | 10.9 | 45.0 |
| 321 (5)..... | 34.5 | 22.6 | 20.1 | 13.9 | 1.7 | 1.6 | 24.7 | 11.5 | 46.6 |
| | 32.1 | 21.9 | 20.1 | 13.9 | 1.6 | 1.6 | 23.5 | 10.9 | 46.4 |
| 308 (6)..... | 35.0 | 20.9 | 17.2 | 13.8 | 2.0 | 1.5 | 22.2 | 10.2 | 45.7 |
| 317 (6)..... | 31.9 | 22.7 | 21.7 | 14.3 | 1.6 | 1.5 | 23.7 | 11.5 | 48.8 |
| 319 (6)..... | 29.7 | 21.4 | 20.4 | 13.9 | 1.4 | 1.5 | 23.7 | 11.5 | 48.8 |
| 324 (6)..... | 35.9 | 21.2 | 20.0 | 13.6 | 1.8 | 1.6 | 22.2 | 11.2 | 51.0 |
| 325 (6)..... | 37.9 | 22.6 | 16.7 | 13.2 | 2.3 | 1.7 | 23.6 | 11.1 | 47.1 |
| | 34.1 | 21.8 | 19.2 | 13.8 | 1.8 | 1.6 | 22.9 | 11.1 | 48.3 |
| 316 (7)..... | 32.2 | 22.5 | 21.0 | 13.6 | 1.6 | 1.7 | 21.7 | 11.7 | 53.8 |
| 341 (7)..... | 32.1 | 21.3 | 18.8 | 13.5 | 1.8 | 1.6 | 19.5 | 11.6 | 59.3 |
| | 32.2 | 21.9 | 19.9 | 13.6 | 1.7 | 1.7 | 20.6 | 11.7 | 56.6 |
| Group (1)..... | 31.8 | 22.7 | 19.4 | 13.6 | 1.6 | 1.7 | 20.7 | 11.2 | 54.2 |
| " (2)..... | 34.9 | 25.4 | 17.8 | 13.7 | 2.0 | 1.9 | 25.1 | 11.5 | 53.4 |
| " (3)..... | 34.4 | 24.4 | 19.3 | 13.6 | 1.8 | 1.8 | 22.2 | 11.2 | 50.6 |
| " (4)..... | 31.6 | 21.9 | 19.3 | 13.6 | 1.7 | 1.6 | 22.5 | 11.7 | 52.0 |
| " (5)..... | 32.1 | 21.9 | 20.1 | 13.9 | 1.6 | 1.6 | 23.5 | 10.9 | 46.4 |
| " (6)..... | 34.1 | 21.8 | 19.2 | 13.8 | 1.8 | 1.6 | 22.9 | 11.1 | 48.3 |
| " (7)..... | 32.2 | 21.9 | 19.9 | 13.6 | 1.7 | 1.7 | 20.6 | 11.7 | 56.6 |
| True average..... | 33.0 | 23.0 | 19.2 | 13.7 | 1.7 | 1.7 | 22.5 | 11.3 | 53.2 |

(b) Description of Growing Plant and Green Leaf

The differences in the field growth of the Burley varieties were also sufficiently distinct to warrant a classification into various type groups. Some varieties were very erect, others were more drooping with a spreading leaf, and still others were intermediate in type. The methods for describing the individual plant and leaf characteristics were similar to those employed in the study of the flue-cured varieties.

GROUP 1—STANDUP

The varieties in Group 1 are easily recognized by their tall and very erect habit of growth. The internodes were short and the plants usually possessed a greater number of leaves than some of the more drooping varieties. The leaves were largely latifoliate to ovate in shape, possessing fairly fine, smooth fibres, and were light green in colour. This group included varieties adapted to the production of cigarette tobacco.

GROUP 2—JUDY'S PRIDE

The varieties in Group 2 are recognized in the field by their semi-erect habit of growth, the internodes were medium long, and the plants carried an average number of leaves. The leaves were ovate to latifolate in shape, slightly ruffled on the surface, medium green in colour and slightly cucullate. The varieties on this group are extensively grown, and are well adapted for cigarette purposes.

GROUP 3—KELLEY

Any type difference between Group 2 and Group 3 was determined more from the cured leaf qualities than from the habit of growth. The varieties of both these groups resembled what is known as the "Kelley" type. Under certain soil conditions, varieties in Group 3 have been found suitable for both export and cut tobaccos.

GROUP 4—BROADLEAF

These varieties are recognized in the field by their width of leaf and semi-drooping habit of growth. The internodes were medium long, with the leaves attached at fairly wide angles, thus giving the plant a medium tall, spreading appearance. The leaves were ovate to latifolate in shape, medium to dark green in colour, with a puckered or ruffled appearance.

GROUP 5—STATION

The chief difference between Groups 4 and 5 is found in the habit of growth. The varieties in Group 5, although classed as semi-drooping, appeared more erect in the early stages of growth, and were less spreading in appearance as they advanced to maturity. The leaves were quite pointed, being lanceolate to latifolate in shape, light green in colour, and matured medium early.

GROUP 6—LONG LEAF

This group includes varieties that are easily recognized in the field by their very long drooping leaves. As they reached maturity, the top leaves drooped over and the tips of the middle and bottom leaves usually touched the ground. Some varieties in this group produced long, narrow leaves, while others produced broad, latifolate shaped leaves. The leaves usually possessed a coarse, heavy midrib, and were inclined to be brittle. The internodes were medium short.

GROUP 7—MAMMOTH

The varieties in Group 7 may be recognized in the field by their short internodes. Mammoth White Burley carried more leaves than the average standup varieties. The leaves were ovate in shape, and quite broad at the base. They were attached to the stalk at an acute angle, giving the plants a very erect, standup appearance. These varieties came into bud very slowly and matured late.

A description of the growing plant and the green leaf characteristics for these varieties is presented in Table 6.

TABLE 6—DESCRIPTION OF GROWING PLANT AND GREEN LEAF

BURLEY VARIETIES

| Serial No. | Plant | Leaf |
|---------------------|---|--|
| <i>Group 1—</i> | | |
| <i>Standup—</i> | | |
| 311 | Tall, very erect, short internodes, many leaves, leaves attached at fairly wide angles, general shape of plant cylindrical. | Ovate to latifoliate, base obtuse slightly auriculate, tip acute, surface smooth, light green colour. |
| 322 | Tall, semi-erect, medium short internodes, many leaves, leaves attached at acute angles. | Ovate to latifoliate, base semi-obtuse auriculate, tip broadly acute, slightly cucullate, surface slightly rough, medium green colour. |
| 323 | Tall, semi-erect, medium short internodes, many leaves, leaves attached at acute angles but carries 2 to 3 more leaves. | Ovate to latifoliate, base semi-obtuse auriculate, tip broadly acute slightly cucullate, surface slightly rough, medium green colour. |
| 335 | Tall, very erect, general shape of plant cylindrical, many leaves. | Ovate to latifoliate, base obtuse slightly auriculate, tip acute, surface smooth, light green colour. |
| 336 | Tall, erect, short internodes, many leaves, leaves attached at widely acute angles but carries fewer leaves than 337. | Slightly more ovate than 337. |
| 337 | Tall, erect, short internodes, many leaves, leaves attached at widely acute angles. | Latifoliate, base semi-obtuse slightly auriculate, tip acute, surface medium smooth, medium light green. |
| 338 | Medium tall, semi-erect, average number of leaves, leaves attached at fairly sharp angles. | Latifoliate, base semi-obtuse slightly auriculate, tip acute, surface medium smooth, medium green colour. |
| 340 | Erect, carrying average number of leaves, cylindrical in shape. | Latifoliate, base semi-obtuse slightly auriculate, tip acute, surface medium smooth, medium green colour. |
| 342 | More erect and carries less leaves than 338. | Slightly more oval than 338. |
| <i>Group 2—</i> | | |
| <i>Judy's Pride</i> | | |
| 301 | Medium short, semi-erect, carrying average number of leaves, medium long internodes, leaves attached at semi-acute angles. | Ovate to latifoliate, base obtuse auriculate, tip acute slightly cucullate, surface slightly rough, medium green colour. |
| 302 | Slightly longer internodes than 301. | Ovate to latifoliate, base obtuse auriculate, tip acute slightly cucullate, surface slightly rough, medium green colour. |
| 303 | Slightly longer internodes than 301. | Ovate to latifoliate, base obtuse auriculate, tip acute slightly cucullate, surface slightly rough, medium green colour. |
| 304 | Slightly longer internodes than 301. | Ovate to latifoliate, base obtuse auriculate, tip acute slightly cucullate, surface slightly rough, medium green colour. |
| 344 | Medium tall, semi-erect, medium long internodes, average number of leaves, leaves attached at medium wide angles. | Ovate to latifoliate, base semi-obtuse slightly auriculate, tip sharply acute slightly cucullate, surface medium smooth, light green colour. |
| 345 | Medium tall, semi-erect, medium long internodes, average number of leaves, leaves attached at medium wide angles. | Ovate to latifoliate, base semi-obtuse, slightly auriculate, tip sharply acute slightly cucullate, surface medium smooth, light green. |
| <i>Group 3—</i> | | |
| <i>Kelley—</i> | | |
| 305 | Medium short, erect, medium short internodes, leaves attached at acute angles. | Ovate to latifoliate, base obtuse auriculate, tip broadly acute slightly cucullate, surface slightly rough, medium green colour. |
| 306 | Medium tall, erect, medium long internodes, leaves attached at acute angles. | Slightly broader in leaf than 305. |
| 307 | Medium tall, semi-erect, medium long internodes, average number of leaves, leaves attached at wide angles. | Latifoliate, base semi-obtuse slightly auriculate, tip sharply acute long pointed slightly cucullate, surface slightly rough, medium green. |
| 318 | Medium tall, semi-erect, medium long internodes, leaves attached at acute angles. | Latifoliate, base obtuse auriculate, tip broadly acute slightly cucullate, surface slightly rough, veins light green colour. |
| 343 | Semi-erect, medium long internodes, average number of leaves, leaves attached at wide angles. | Latifoliate, base semi-obtuse slightly auriculate, tip sharply acute long pointed slightly cucullate, surface slightly rough, medium green. |

TABLE 6—DESCRIPTION OF GROWING PLANT AND GREEN LEAF—*Concluded*
BURLEY VARIETIES

| Serial No. | Plant | Leaf |
|-----------------|--|---|
| <i>Group 4—</i> | | |
| Broadleaf— | | |
| 309 | Medium short, semi-droopy leaves, medium short internodes, leaves attached at wide angles. | Lighter green in colour than 312. |
| 310 | Medium tall, semi-droopy leaves, medium long internodes, leaves attached at medium wide angles. | Ovate to latifoliate, base obtuse auriculate, tip broadly acute slightly cucullate, surface slightly rough, medium green colour. |
| 312 | Medium tall, semi-droopy leaves, medium long internodes, leaves spreading and attached at fairly wide angles. | Latifoliate, broad, base very obtuse auriculate, tip broadly acute slightly cucullate, surface slightly rough, dark green colour. |
| 315 | Medium tall, semi-droopy leaves, medium long internodes, leaves attached at fairly wide angles. | Ovate to latifoliate, base obtuse auriculate, tip broadly acute slightly cucullate, surface slightly rough, medium green colour. |
| 339 | Medium tall, semi-droopy leaves, medium long internodes, average number of leaves, leaves attached at wide angles. | Lighter green in colour than 312. |
| <i>Group 5—</i> | | |
| Station— | | |
| 313 | Medium short, semi-droopy leaves, medium short internodes, average number of leaves, leaves attached at wide angles. | Lanceolate to latifoliate, base acuminate, tip sharply acute, surface slightly rough, medium green colour. |
| 314 | Medium short, semi-droopy leaves, medium short internodes, average number of leaves, leaves attached at wide angles. | Lanceolate to latifoliate, base acuminate, tip sharply acute, surface slightly rough, medium green colour. |
| 320 | Medium long, semi-droopy leaves, medium short internodes, leaves attached at wide angles, average number of leaves. | Lanceolate to latifoliate, base acute, slightly auriculate, tip sharply acute cucullate, surface slightly rough, light green colour, especially venation. |
| 321 | Medium long, semi-droopy leaves, medium short internodes, leaves attached at wide angles, average number of leaves. | Lanceolate to latifoliate, base acute slightly auriculate, tip sharply acute cucullate, surface slightly rough, light green colour, especially venation. |
| <i>Group 6—</i> | | |
| Long Leaf— | | |
| 308 | Medium short, very drooping, not many leaves, leaves attached at wide angles. | Lanceolate, base sharply acute slightly auriculate, tip sharply acute, surface rough, dull dark green. |
| 317 | Medium tall, semi-drooping, average number of leaves, leaves attached at medium wide angles. | Latifoliate, base semi-obtuse auriculate, tip acute, surface very rough, dark green colour. |
| 319 | Medium tall, semi-drooping, average number of leaves, leaves attached at wide angles. | Lanceolate to latifoliate, base acute, tip sharply acute, surface slightly rough, dark green colour. |
| 324 | Medium short, semi-droopy leaves, medium short internodes, average number of leaves, leaves attached at wide angles. | Latifoliate broad, base obtuse auriculate, tip acute, surface rough, light green colour. |
| 325 | Medium tall, very droopy leaves, long internodes, not many leaves, leaves attached at wide angles. | Lanceolate to latifoliate, base semi-acute, tip acute, surface smooth, light green colour. |
| <i>Group 7—</i> | | |
| Mammoth— | | |
| 316 | Medium short, erect, many leaves, short internodes, leaves attached at acute angles. | Slightly lighter in colour and broader in the leaf. |
| 341 | Medium short, erect, many leaves, short internodes, leaves attached at acute angles. | Ovate, base very obtuse, tip bluntly acute, surface medium smooth, dark green colour. |

(c) Relative Maturity

The earliest varieties in this type required about 80 days in the field before harvesting. Those which did not mature within the 85-day period, with proper cultural treatment, were considered late. The late varieties, however, in many instances, produced good quality leaf under favourable climatic conditions. Definite restrictions, consequently, can not be placed on varieties which failed to mature early. More detailed information pertaining to relative maturity is presented in Table 7.

TABLE 7.—MATURITY DATA—BURLEY

| Serial No. | Number of days from transplanting to | | | Number of days from topping to harvest | Approx- imate number of days to maturity |
|-----------------|--|---------|----------------|--|--|
| | First bud | Topping | First bloom | | |
| <i>Group 1—</i> | | | | | |
| 311..... | 47 | 52 | 54 | 28 | 80 |
| 322..... | 47 | 52 | 53 | 31 | 83 |
| 323..... | 47 | 54 | 53 | 29 | 83 |
| 335..... | 47 | 53 | 54 | 28 | 81 |
| 336..... | 47 | 53 | 53 | 30 | 83 |
| 337..... | 47 | 54 | 55 | 30 | 84 |
| 338..... | 52 | 52 | 55 | 31 | 83 |
| 340..... | 47 | 53 | 54 | 31 | 84 |
| 342..... | 47 | 54 | 54 | 31 | 85 |
| <i>Group 2—</i> | | | | | |
| 301..... | 52 | 54 | 54 | 31 | 85 |
| 302..... | 47 | 55 | 54 | 31 | 86 |
| 303..... | 50 | 54 | 54 | 31 | 85 |
| 304..... | 47 | 55 | 54 | 31 | 86 |
| 344..... | 47 | 56 | 50 | 29* | 85 |
| 345..... | 52 | 56 | 54 | 29* | 85 |
| <i>Group 3—</i> | | | | | |
| 305..... | 47 | 54 | 53 | 31 | 85 |
| 306..... | 47 | 55 | 53 | 31 | 86 |
| 307..... | 47 | 55 | 53 | 31 | 86 |
| 318..... | 47 | 54 | 53 | 31 | 85 |
| 343..... | 47 | 56 | 52 | 26* | 82 |
| <i>Group 4—</i> | | | | | |
| 309..... | 47 | 55 | 55 | 31 | 86 |
| 310..... | 47 | 55 | 50 | 31 | 86 |
| 312..... | 47 | 58 | 52 | 31 | 89 |
| 315..... | 47 | 54 | 53 | 31 | 85 |
| 339..... | 47 | 58 | 54 | 31 | 89 |
| <i>Group 5—</i> | | | | | |
| 313..... | 47 | 55 | 50 | 31 | 86 |
| 314..... | 52 | 56 | 54 | 31 | 87 |
| 320..... | 47 | 49 | 53 | 31 | 80 |
| 321..... | 47 | 50 | 53 | 31 | 81 |
| <i>Group 6—</i> | | | | | |
| 308..... | 47 | 58 | 50 | 31 | 89 |
| 317..... | 47 | 52 | 53 | 31 | 83 |
| 319..... | 52 | 58 | 54 | 31 | 89 |
| 324..... | 50 | 53 | 55 | 31 | 84 |
| 325..... | 43 | 51 | 47 | 31 | 82 |
| <i>Group 7—</i> | | | | | |
| 316..... | 52 | 60 | 57 | 31 | 91 |
| 341..... | 50 | 60 | 53 | 31 | 91 |

*Av. of 1932-33 only.

(d) Relative Merits, Yield and Grade Index

An examination of Table 6 shows the major differences in habit of growth. Varieties, erect in habit, yielded a higher percentage of cigarette tobacco. Most of the standup varieties yielded a comparatively thin fine textured leaf, which could be classed as cigarette Burley. The heavy-bodied red Burley varieties, more drooping in habit, came in a class with a quality more suitable for strong pipe and chewing tobacco, a type of Burley with a limited export demand.

The merits of these varieties based on yield and quality data are presented below.

GROUP 1—STANDUP

Both the grade values and yields varied considerably in this group. The Kentucky Station strains showed slightly lower quality than either of the local varieties (322, 323).

Kentucky Station Strains (311, 335, 336, 337, 338, 340, 342) originated from the Kentucky Experiment Station in 1929 and 1930. Selections 337 and 342 gave considerably higher yields than the other strains in the test. The quality was good also. The lower yields of certain strains can be attributed to the smaller size of the leaves. The cured leaf from these strains exhibited a fine smooth texture and contained those qualities desirable in cigarette tobacco. This group showed a small degree of resistance to black root-rot.

Resistant Standup (322) matured early and produced a fair proportion of fine-textured cigarette-quality tobacco. In spite of what the name implies, this variety is quite susceptible to black root-rot.

Standup Resistant (323) was obtained from the University of Wisconsin. Owing to its high degree of resistance to black root-rot, Standup Resistant has been grown extensively in the district during the past seven or eight years. It produces a fairly large, thin bright leaf, but the texture is slightly brittle for good quality cigarette tobacco.

GROUP 2—JUDY'S PRIDE

Strains of Judy's Pride and Halley's Special are represented in this group. The Judy's Pride strains grew fairly true to type, showing but a slight variation in yield and quality. The yield of Halley's Special was slightly higher than Judy's Pride. Leaf texture was quite similar in all strains.

Judy's Pride (301, 302, 303, 304) is extensively grown and, apparently, is well-adapted to certain soils in the district. It is not however, resistant to black root-rot. Judy's Pride is believed to have originated from a selection, rather than a cross, Kelley being the parent variety. This variety is suitable for the manufacture of cigarettes and fine smoking mixtures.

Halley's Special (344, 345) has been grown over quite a wide acreage during the past few years. It gave better results than Judy's Pride on the heavier soils, but was also quite susceptible to black root-rot.

GROUP 3—KELLEY

Under certain soil conditions varieties in Group 3 have been found suitable for both export and domestic use. The various strains of Kelley Burley showed a fairly distinct varietal difference. Kelley White Burley (305, 306) was more erect and produced a higher yield and finer quality than the so-called "Resistant" Kelley and Vimont Kelley (343 and 307). Although the word "resistant" is attached to two varieties (343 and 318) in Group 3 neither variety proved to be resistant on root-rot infested soil at the Harrow Station.

Kelley White Burley (305) was obtained from the Bureau of Plant Industry, United States Department of Agriculture. This variety usually is known as Standup Kelley, and when grown on the lighter soils produces a good quality cigarette leaf. Strain 306 from the Kentucky Experiment Station is apparently a similar selection.

Vimont Kelley (307) was obtained also from the Kentucky Station. Under field conditions it exhibited a more spreading appearance than 306, and produced a thicker, longer leaf. It was similar to the strain obtained from the British Leaf Tobacco Company (343).

Root-Rot Resistant White Burley (318) produced a thick, reddish leaf suitable for pipe tobacco. As previously stated, it was not considered immune to black root-rot under Western Ontario conditions.

Kelley (343), frequently referred to as "Resistant" Kelley, was found to be a non-resistant variety under local conditions. Root-rot in the soil reduced the yields fifty per cent in some instances. The cured leaf was thick and inclined to be coarse and heavy.

GROUP 4—BROADLEAF

Several varieties in this group produced a quality of tobacco more suitable for the manufacture of pipe and chewing tobaccos. This group of broadleaf varieties all gave a high yield over the four-year period (1930-1933). The grade index value, however, was below the average of all previous groups, indicating a slightly inferior quality. The leaf was too coarse and dark for cigarette purposes. All varieties in this group showed a low degree of resistance to the black root-rot disease.

White Twist Bud (309), in name, refers to the type of Burley rather than to the variety. Twist bud was a type of semi-drooping broadleaf Burley which originated before the light standup Burley came into existence, and this strain as designated here is a strain of that type. The internodes are medium short. The leaf is light green in colour. White Twist Bud is more suitable for the production of pipe than cigarette tobacco.

Stoner (310) is a medium tall, semi-drooping variety with relatively short leaves. The cured leaf was inclined to be red. Stoner produced the lightest yields in Group 4.

Broadleaf Burley (312) is more of an export type of White Burley which was extensively grown previous to the introduction of the standup varieties. It was popular when the demand for heavy red leaf was greater than it is at present. Broadleaf White Burley has a large leaf and usually produces a high yield.

Red Burley (315) exhibited better quality than other varieties in Group 4. It produced a large, medium bright, thin leaf, slightly brittle in texture.

Valleau Selection No. 26 (339) was obtained from the Kentucky Experimental Station in 1929. It also is a heavy yielder of thick red tobacco.

GROUP 5—STATION

This group of varieties is more suitable for pipe and chewing tobaccos. Group 5 is made up of two strains of Station Standup and two strains of Green Briar. Although the Station Standup strains showed some similarity in the field, a slight difference was noted in yield and quality of the cured leaf. The Kentucky strain of Green Briar (314) was a darker green in colour than the Harrow strain and also gave a slightly lower yield and a consistently poorer grade index value.

Green Briar (313, 314), under similar conditions, is a higher yielder than *Station Standup*. It is more drooping in habit and produces a broader, shorter leaf. Owing to its coarse texture and thick red leaf, *Green Briar* is not adapted for the manufacture of pipe and chewing tobaccos. It is not resistant to black root-rot.

Station Standup (320, 321), in the history of Burley tobacco in Western Ontario, held a very important place as an intermediate type during the gradual change over from the old-fashioned broadleaf type to the present-day cigarette type. The Imperial Tobacco Company's strain (321) gave higher yields than the Harrow Station strain. It is not resistant to black root-rot.

GROUP 6—LONG LEAF

The varieties in this group vary in both yield and quality. Broadleaf Resistant (324) and Hope Standup Burley (319) produced the highest yield. Except for C.R.B. (325) the texture of the different varieties in Group 6 was considered too coarse for cigarette purposes.

Narrow Leaf Burley (308) is similar, in habit of growth, to Broadleaf Resistant (324) except for its narrower leaf. It produces a coarse leaf and is not suitable as a cigarette tobacco. *Narrow Leaf Burley* originated as a selection and was obtained from a grower in Malden Township.

Lockwood White Burley (317) was obtained from the Bureau of Plant Industry, United States Department of Agriculture, in 1930. It can be distinguished in the field by its characteristic dark green colour and ruffled or puckered leaf surface. The cured leaf is medium red in colour, coarse in texture, and slightly brittle.

Hope Standup (319) was supplied by the British Leaf Tobacco Company, Chatham, in 1929. The cured leaf is coarse and brittle in texture and medium red in colour. For a few years Hope's Standup was grown for the export market.

Broadleaf Resistant (324) sometimes known as "Johnson's Resistant", was the result of certain crosses made by Dr. James Johnson of the University of Wisconsin. This variety reached its peak of production between 1924 and 1928 and became very popular with growers whose soil had become infected with black root-rot. In recent years, however, the demand for a finer quality of cigarette leaf has turned the attention of growers to more suitable varieties.

C.R.B. (325), known as Routt's Burley, was developed by Mr. G. C. Routt, Tobacco Specialist and Plant Breeder, who was associated with the Harrow Station about 1914. C.R.B. never became popular in the district owing to its low yield. It produced only 10 or 12 leaves when topped at normal height. The cured leaf was a medium bright colour, fine in texture, and could be classed as a cigarette variety. C.R.B. (325) showed considerable resistance to black root-rot.

GROUP 7—MAMMOTH

Valleau Selection No. 28 (341), in appearance, displayed less growth than *Mammoth White Burley*. The cured leaf quality of both varieties was below the average of other groups.

Mammoth White Burley (316) was obtained from the Bureau of Plant Industry, United States Department of Agriculture. It produced a large, ovate-shaped leaf giving a heavy yield, but the texture of the leaf was inclined to be coarse and brittle.

Valleau Selection No. 28 (341) was secured from the Kentucky Experiment Station in 1929. It produced a medium sized ovate-shaped leaf which cured thin and medium bright in colour, but the texture was too brittle to class this selection among the better cigarette varieties.

In Table 8 information is presented regarding the cured leaf qualities, yield and grade index values for individual varieties.

TABLE 8.—QUALITY, YIELD AND GRADE INDEX
BURLEY VARIETIES

| Serial No. | Cured leaf qualities | Yield average | Grade Index average |
|----------------------------------|---|------------------|---------------------------|
| | | lb. | |
| <i>Group 1—Standup—</i> | | | |
| 311..... | Colour bright light straw, body thin, texture fine and smooth, medium small leaf, very good quality, cigarette type. | 1,557 | 8.6 |
| 322..... | Colour bright, medium straw, body thin, texture and venation medium fine and smooth, medium long leaf, good quality, cigarette type. | 1,547 | 9.8 |
| 323..... | Colour bright, medium straw, body thin, texture and venation medium fine and smooth, medium long leaf, good quality, cigarette type. | 1,726 | 9.7 |
| 335..... | Colour uniformly bright, body thin, texture very fine and smooth and well finished, medium short leaf, very good quality, cigarette type. | 1,470 | 8.3 |
| 336..... | Slightly finer and thinner than 337..... | 1,408 | 9.1 |
| 337..... | Colour bright, body medium thin, texture and venation fine and smooth, medium sized leaf, good quality, cigarette type. | 1,753 | 9.1 |
| 338..... | Colour bright, very fine smooth texture, thin small sized leaf, very good quality, cigarette type. | 1,494 | 8.6 |
| 340..... | Colour bright, very fine smooth texture, thin body, small sized, good quality, cigarette type. | 1,557 | 6.4 |
| 342..... | Colour bright, very fine smooth texture, thin small sized leaf, (Slightly larger than 338). | 1,803 | 8.1 |
| <i>Group 2—Judy's Pride—</i> | | | |
| 301..... | Colour bright, texture fine and smooth, body thin medium size, very good quality, cigarette type. | 1,775 | 8.9 |
| 302..... | Slightly smaller leaf than 301, otherwise same quality..... | 1,811 | 9.8 |
| 303..... | Slightly redder in colour than 302, medium sized leaf, medium cigarette quality. | 1,905 | 10.7 |
| 304..... | Slightly smaller leaf than 301, otherwise same quality..... | 1,874 | 9.7 |
| 344..... | Very bright light straw colour, very fine smooth texture and venation, medium thin body, medium long leaf, excellent cigarette quality. | 2,141 | 10.1 |
| 345..... | Very bright light straw colour, very fine smooth texture and venation, medium thin body, medium long leaf, excellent cigarette quality. | 2,059 | 9.8 |
| <i>Group 3—Kelley—</i> | | | |
| 305..... | Medium bright colour, texture and venation fine and smooth, body medium thick, medium sized leaf, medium cigarette quality. | 1,675 | 9.9 |
| 306..... | Medium red colour, not quite as well finished as 305. Pipe quality. | 1,704 | 10.0 |
| 307..... | Medium red colour, texture fairly smooth, body medium thick, medium long leaf, good pipe quality. | 1,983 | 8.0 |
| 318..... | Bright colour, medium fine venation and texture, body medium thin, large size, medium cigarette quality. | 1,753 | 8.9 |
| 343..... | Medium bright colour, texture fine and smooth, medium body and length, very good pipe quality. | 1,931 | 9.1 |
| <i>Group 4—Broadleaf—</i> | | | |
| 309..... | Medium red colour, texture medium fine, medium body and length. Fair pipe quality. | 1,868 | 8.5 |
| 310..... | Medium red colour, texture slightly coarse and brittle, body medium thin, medium sized leaf, low cigarette quality. | 1,712 | 7.4 |
| 312..... | Red colour, texture and venation coarse, body thick and heavy, large sized leaf, pipe quality. | 1,958 | 5.9 |
| 315..... | Medium bright colour, texture fine and medium smooth, body medium thin, large sized leaf, medium cigarette quality. | 1,928 | 8.9 |
| 339..... | Medium red colour, texture slightly coarse, body medium thick, medium long leaf. Fair pipe quality. | 1,933 | 5.8 |

TABLE 8.—QUALITY, YIELD AND GRADE INDEX—*Concluded*

BURLEY VARIETIES

| Serial No. | Cured leaf varieties | Yield average | Grade Index average |
|---------------------------|--|---------------|---------------------|
| | | lb. | |
| <i>Group 5—Station—</i> | | | |
| 313..... | Medium red colour, texture medium fine and smooth, body thick and stretchy, medium long leaf, very good pipe quality. | 1,713 | 9.6 |
| 314..... | Slightly redder and coarser in texture than 313..... | 1,679 | 6.2 |
| 320..... | Medium bright colour, texture medium fine, venation slightly coarse, body thick and stretchy, size very long, good pipe quality. | 1,722 | 9.2 |
| 321..... | Slightly thinner in the leaf than 320 showing more quality... | 1,852 | 9.3 |
| <i>Group 6—Long Leaf—</i> | | | |
| 308..... | Medium red colour, texture fairly fine and smooth, slightly heavy midrib, body medium thick, medium long leaf. Good pipe quality. | 1,721 | 8.0 |
| 317..... | Medium red colour, texture slightly coarse and brittle and poorly finished, body medium thin, size medium long. Medium pipe quality. | 1,654 | 7.9 |
| 319..... | Medium red colour, texture coarse and slightly brittle, body medium thick, size long. Medium pipe quality. | 1,862 | 6.5 |
| 324..... | Medium bright colour, texture coarse and brittle, body medium thin, large size. Coarse cigarette quality. | 2,025 | 8.2 |
| 325..... | Bright colour, texture very fine and smooth, fine venation, body thin, small size. Cigarette quality. | 1,488 | 8.9 |
| <i>Group 7—Mammoth—</i> | | | |
| 316..... | Medium red, texture coarse and woody, body thin, large size. Fair cigarette quality. | 2,012 | 7.9 |
| 341..... | Medium bright colour, texture slightly brittle, body thin, small size, fair cigarette quality. | 1,606 | 6.5 |

(e) Brief Discussion

Thirty-six varieties and strains of Burley tobacco were tested during this study. Differences in colour, texture and thickness of the leaf made it possible to classify the various varieties and strains into fairly distinct groups. Habit of growth and relative number of days to maturity were taken into consideration as well. As a result of this study it was possible to select and classify according to their purpose a few of the outstanding varieties.

CLASS A.—CIGARETTE BURLEY VARIETIES

| Variety | Relative quality | Maturity | Soil adaptation |
|---------------------------|------------------|-----------------|------------------------|
| Halley Special (344)..... | Good..... | Medium early... | Medium to heavy soils. |
| Judy's Pride (303)..... | Good..... | Medium late... | Light to medium soils. |
| Valleau 36-12 (311)..... | Good..... | Early..... | Medium to heavy soils. |

CLASS B.—INTERMEDIATE BURLEY VARIETIES

| | | | |
|------------------------------|------------|-----------------|------------------------|
| Standup Resistant (323)..... | Medium.... | Early..... | Medium to heavy soils. |
| Kelley Standup (306)..... | Medium.... | Medium early... | Light to medium soils. |
| Valleau No. 5 (342)..... | Medium.... | Medium late... | Light to medium soils. |

CLASS C.—EXPORT BURLEY VARIETIES

| | | | |
|----------------------------|------------|-----------------|------------------------|
| Station Standup (321)..... | Good..... | Medium early... | Medium to heavy soils. |
| Vimont Kelley (307)..... | Medium.... | Medium late... | Light to medium soils. |
| Green Briar (313)..... | Good..... | Medium late... | Light to medium soils. |

All of the varieties in class A are of the medium Broadleaf Standup type. They produced the largest percentage of high quality cigarette tobacco. Those in class B were of an intermediate type as far as their use in manufactured tobaccos was concerned, while those in class C rated almost entirely as export tobaccos.

X. DARK VARIETIES

(a) Field Growth Measurements

The limited demand for this type of tobacco in the domestic trade, coupled with the uncertainty of the export market for Canadian dark-fired wrappers and heavy dark tobaccos, has prevented this type of tobacco from establishing for itself an important place in the industry. The varieties are limited in number when compared with flue-cured and Burley tobaccos, and are confined more or less to three common types: Greenwood, Yellow Pryor and One Sucker.

A study of all available varieties from different sources has made it possible to separate them into five fairly distinct groups. These group differences are based on all the available data collected on each variety during 1930 to 1932, and are not dependent entirely on field growth measurements.

The varieties in Group 1 were the shortest, and those in Group 5 the tallest, yet all were reduced to about the same height when topped. The plants in group 1 bore a few more leaves, but their number approximated the average number of groups after topping. The average length of internodes in group 1 was slightly longer after topping than before topping. The length of the leaves was fairly consistent, with the exception of those in Group 5 which were from one to two inches longer than the others, while those in Group 3 were considerably narrower.

Further data relative to field growth measurements are found in Table 9.

TABLE 9—FIELD GROWTH MEASUREMENTS
DARK VARIETIES

| Number of variety | Plant | | | | Stalk | | Leaf | | |
|-------------------|----------------|---------|--------------------------|---------|----------------------|---------|--------|-------|---------|
| | Average height | | Average number of leaves | | Length of internodes | | Length | Width | Index |
| | Not topped | Top-ped | Not topped | Top-ped | Not topped | Top-ped | | | |
| | in. | in. | | | in. | in. | in. | in. | |
| 501 (1)..... | 27.4 | 19.5 | 19.0 | 10.7 | 1.4 | 1.8 | 20.9 | 11.9 | 57.1 |
| 502 (1)..... | 28.4 | 21.0 | 18.6 | 10.9 | 1.6 | 1.9 | 21.3 | 11.6 | 54.5 |
| 503 (1)..... | 27.9 | 20.9 | 18.5 | 10.6 | 1.5 | 2.0 | 21.5 | 11.3 | 52.6 |
| 504 (1)..... | 27.2 | 19.6 | 18.3 | 10.6 | 1.5 | 1.9 | 20.5 | 11.3 | 54.9 |
| 511 (1)..... | 28.7 | 20.7 | 18.3 | 10.9 | 1.6 | 1.9 | 21.2 | 10.2 | 48.2 |
| 519 (1)..... | 29.7 | 20.4 | 17.1 | 10.7 | 1.7 | 1.9 | 21.6 | 11.1 | 51.7 |
| | 28.2 | 20.4 | 18.3 | 10.7 | 1.6 | 1.9 | 21.2 | 11.4 | 53.2 |
| 505 (2)..... | 27.5 | 19.6 | 16.3 | 10.1 | 1.7 | 2.0 | 21.3 | 12.7 | 59.7 |
| 506 (2)..... | 35.3 | 22.7 | 17.4 | 10.8 | 2.0 | 2.1 | 21.4 | 11.5 | 54.1 |
| 515 (2)..... | 28.5 | 20.1 | 16.6 | 10.4 | 1.7 | 2.0 | 20.7 | 11.6 | 56.3 |
| 516 (2)..... | 28.8 | 20.8 | 15.9 | 10.3 | 1.8 | 2.0 | 21.6 | 12.7 | 59.3 |
| 518 (2)..... | 32.1 | 21.9 | 16.1 | 10.5 | 2.0 | 2.1 | 22.4 | 12.5 | 56.1 |
| 523 (2)..... | 32.2 | 20.8 | 16.0 | 10.2 | 2.0 | 2.1 | 20.7 | 11.9 | 59.9 |
| 524 (2)..... | 28.2 | 20.4 | 16.2 | 10.4 | 1.7 | 2.0 | 22.1 | 12.9 | 58.9 |
| 547 (2)..... | 33.9 | 24.4 | 14.5 | 10.0 | 2.3 | 2.4 | 22.5 | 13.3 | 59.2 |
| 550 (2)..... | 32.1 | 24.4 | 14.9 | 10.4 | 2.2 | 2.3 | 24.1 | 13.7 | 57.2 |
| | | | | | | | | | 2 years |
| | | | | | | | | | 2 years |
| | 31.0 | 21.7 | 16.0 | 10.3 | 1.9 | 2.1 | 21.9 | 12.5 | 57.9 |

TABLE 9—FIELD GROWTH MEASUREMENTS—*Concluded*

DARK VARIETIES

| Number of variety | Plant | | | | Stalk | | Leaf | | |
|-------------------|----------------|--------|-----------------------|--------|----------------------|--------|--------|-------|-------|
| | Average height | | Average number leaves | | Length of internodes | | Length | Width | Index |
| | Not topped | Topped | Not topped | Topped | Not topped | Topped | | | |
| | in. | in. | | | in. | in. | in. | in. | |
| 520 (3)..... | 27.7 | 18.2 | 17.2 | 10.9 | 1.6 | 1.7 | 21.9 | 7.6 | 35.8 |
| 521 (3)..... | 32.2 | 20.6 | 17.7 | 11.1 | 1.9 | 1.9 | 20.7 | 9.4 | 46.2 |
| 522 (3)..... | 34.4 | 21.7 | 15.3 | 10.6 | 2.2 | 2.7 | 20.4 | 9.8 | 48.3 |
| | 31.4 | 20.2 | 16.7 | 10.9 | 1.9 | 2.1 | 21.0 | 8.9 | 43.4 |
| 510 (4)..... | 32.2 | 21.1 | 15.9 | 10.4 | 2.0 | 2.0 | 21.9 | 12.6 | 57.8 |
| 512 (4)..... | 32.4 | 21.4 | 15.1 | 10.2 | 2.1 | 2.1 | 21.3 | 13.5 | 64.2 |
| 513 (4)..... | 29.4 | 21.4 | 16.2 | 10.5 | 1.8 | 2.1 | 21.9 | 13.0 | 59.8 |
| 517 (4)..... | 31.3 | 21.2 | 15.8 | 10.3 | 1.9 | 2.0 | 21.2 | 13.1 | 61.3 |
| 544 (4)..... | 30.1 | 22.5 | 16.3 | 10.2 | 1.9 | 2.3 | 23.5 | 14.8 | 63.0 |
| | 31.1 | 21.5 | 15.9 | 10.3 | 1.9 | 2.1 | 22.0 | 13.4 | 61.2 |
| 507 (5)..... | 40.3 | 23.0 | 16.4 | 10.7 | 2.4 | 2.1 | 22.0 | 11.0 | 50.6 |
| 508 (5)..... | 29.8 | 20.2 | 16.2 | 10.3 | 1.8 | 2.0 | 22.7 | 12.5 | 55.5 |
| 509 (5)..... | 27.4 | 20.1 | 16.3 | 10.7 | 1.7 | 1.9 | 23.1 | 12.0 | 52.0 |
| 514 (5)..... | 38.8 | 24.5 | 16.0 | 10.6 | 2.5 | 2.3 | 23.4 | 12.3 | 52.8 |
| 545 (5)..... | 33.1 | 23.2 | 16.1 | 10.5 | 2.0 | 2.2 | 23.2 | 12.1 | 52.1 |
| 546 (5)..... | 31.2 | 23.5 | 15.4 | 10.6 | 2.1 | 2.2 | 23.9 | 12.3 | 52.1 |
| 548 (5)..... | 35.9 | 25.4 | 16.4 | 11.2 | 2.3 | 2.3 | 23.4 | 11.9 | 51.3 |
| 549 (5)..... | 32.7 | 23.6 | 16.9 | 10.8 | 2.0 | 2.2 | 23.1 | 11.7 | 50.9 |
| | 33.7 | 22.9 | 16.2 | 10.7 | 2.1 | 2.2 | 23.1 | 12.0 | 52.2 |
| Group (1)..... | 28.2 | 20.4 | 18.3 | 10.7 | 1.6 | 1.9 | 21.2 | 11.4 | 53.2 |
| “ (2)..... | 31.0 | 21.7 | 16.0 | 10.3 | 1.9 | 2.1 | 21.9 | 12.5 | 57.9 |
| “ (3)..... | 31.4 | 20.2 | 16.7 | 10.9 | 1.9 | 2.1 | 21.0 | 8.9 | 43.4 |
| “ (4)..... | 31.1 | 21.5 | 15.9 | 10.3 | 1.9 | 2.1 | 22.0 | 13.4 | 61.2 |
| “ (5)..... | 33.7 | 22.9 | 16.2 | 10.7 | 2.1 | 2.2 | 23.1 | 12.0 | 52.2 |
| True average..... | 31.2 | 21.6 | 16.5 | 10.5 | 1.9 | 2.1 | 22.0 | 12.0 | 54.6 |

(b) Description of Growing Plant and Green Leaf

The varieties which are grown in Ontario on a commercial basis are confined more or less to three common types: (1) Greenwood, a dark wrapper type suitable for fire-curing; (2) Yellow Pryor, a light wrapper broadleaf air-cured type, and (3) One Sucker, a narrow leaf air-cured type. All the available varieties were collected in a similar manner to the flue-cured and Burley types, and studied in the same detail.

GROUP 1—GREENWOOD

These plants are semi-erect, bearing long, pointed leaves, latifolate in shape, with semi-obtuse bases. The leaf surface is medium smooth and medium dark to bluish green in colour, while the venation is not particularly prominent.

GROUP 2—LITTLE HILL

The appearance of the varieties in this group is characterized by a semi-drooping habit of growth. The leaves are narrow, latifolate in shape, with acute tips, auriculate petioles and semi-obtuse bases. The leaf surface, in general, is slightly ruffled, especially along the shoulder. The veins are prominent and the colour is usually a dark green.

GROUP 3—ONE SUCKER

The varieties in this Group have a spreading, semi-erect habit of growth. The leaves are stenophyllate to lanceolate in shape, with long, pointed, sharply acute, slightly cucullate tips. The bases of the leaves are acute and slightly auriculate. The venation is prominent. The leaf surface is ruffled, glossy, and light green in colour.

GROUP 4—MAMMOTH

The plants are semi-drooping and possess large latifoliate to ovate leaves. The leaf tips are semi-acute while the bases are obtuse and auriculate. The leaf surface is ruffled and the venation is fine and smooth. The leaves are medium light green in colour.

GROUP 5—PRYOR

In Group 5 the plants are drooping in habit. The leaves are large, latifoliate but less ovate than those in the preceding group. The tips of the leaves are semi-acute, the bases obtuse, while the surface of the leaf is smooth and silky. The leaves are fine veined and are medium light green in colour.

Table 10 includes a description of the growing plant and green leaf of these varieties.

TABLE 10.—DESCRIPTION OF GROWING PLANT AND GREEN LEAF
DARK VARIETIES

| Serial Number | Plant | Leaf |
|-----------------------------|---|--|
| <i>Group 1—Greenwood—</i> | | |
| 501..... | Tall growing, resembles 503..... | Slightly narrower and shorter in the leaf than 503. |
| 502..... | Tall growing semi-erect, long internodes, number of leaves above average. | Latifoliate in shape, tip acute more pointed than 519, surface medium smooth, bluish green. |
| 503..... | Tall growing semi-erect, long internodes, number of leaves above average. | Latifoliate in shape, tip acute more pointed than 519, surface medium smooth, bluish green. |
| 504..... | More drooping than 503..... | Leaf broader and darker green in colour than 503, smooth, some variation, off type. |
| 511..... | Medium tall growing, medium long internodes. | Resembles 503, slightly shorter in the leaf. |
| 519..... | Medium tall growing semi-erect, long internodes, number of leaves below average. | Latifoliate in shape, tip acute slightly cucullate, base of leaves semi-obtuse slightly auriculate, leaf surface smooth, medium green. |
| <i>Group 2—Little Hill—</i> | | |
| 505..... | Medium tall, semi-erect, number of leaves above average. | Latifoliate, base obtuse decidedly auriculate, tip acute, dark green, surface rough especially near shoulder of leaf. |
| 506..... | Medium tall, semi-erect, number of leaves above average. | Latifoliate, base obtuse decidedly auriculate, tip acute, dark green, surface rough especially near shoulder of leaf. |
| 515..... | Medium tall, semi-erect, average number of leaves. | Ovate to latifoliate, base obtuse decidedly auriculate, tip acute, surface smooth, medium green, leaf slightly pointed. |
| 516..... | Medium short, semi-drooping, average number of leaves. | Ovate to latifoliate, base obtuse decidedly auriculate, tip acute, surface smooth, medium green. |
| 518..... | Medium short, semi-drooping, internodes medium short, number of leaves above average. | Shorter leaf than 524, slightly darker and more ruffled leaf surface. |
| 523..... | Medium tall, semi-erect, medium long internodes, number of leaves above average. | Latifoliate, base semi-obtuse auriculate, tip acute, surface slightly rough, dark green colour. |
| 524..... | Medium short, semi-drooping, internodes medium short, number of leaves above average. | Latifoliate, base obtuse decidedly auriculate, tip acute, surface medium smooth, heavy midrib, medium green colour. |

TABLE 10.—DESCRIPTION OF GROWING PLANT AND GREEN LEAF—*Concluded*
DARK VARIETIES

| Serial Number | Plant | Leaf |
|----------------------------|---|--|
| 547..... | Medium short, semi-drooping, internodes medium short, number of leaves above average. | Shorter leaf than 524, slightly darker and more ruffled leaf surface. |
| 550..... | Medium short, semi-drooping internodes medium short, number of leaves above average. | Shorter leaf than 524, slightly darker and more ruffled leaf surface. |
| <i>Group 3—One Sucker—</i> | | |
| 520..... | Semi-drooping, short internodes, average number of leaves. | Stenophyllate to lanceolate, base acute slightly auriculate, tip sharply acute slightly cucullate, prominent venation, very glossy, light green. |
| 521..... | Semi-erect, spreading taller than 520..... | Lanceolate, base acute slightly auriculate, tip sharply acute slightly cucullate, ruffled surface, glossy, light green colour. |
| 522..... | Semi-erect, spreading taller than 520..... | Lanceolate, base acute slightly auriculate, tip sharply acute slightly cucullate, ruffled surface, glossy, light green colour. |
| <i>Group 4—Mammoth</i> | | |
| 510..... | Medium tall growing semi-drooping, number of leaves below average. | Broader in the leaf or more ovate than 513, smoother. |
| 512..... | Medium short, semi-drooping, number of leaves below average. | Ovate to latifoliate, large, base obtuse decidedly auriculate, tip broadly acute, surface smooth, medium green colour. |
| 513..... | Semi-drooping, medium tall, number of leaves above average. | Latifoliate, semi-obtuse, surface very ruffled with puckered appearance. |
| 517..... | Semi-drooping, short internodes, number of leaves below average. | Latifoliate, base semi-obtuse auriculate, tip acute cucullate, surface slightly rough, dark green colour. |
| 544..... | Medium tall growing semi-drooping, number of leaves below average. | Broader in the leaf or more ovate than 513, smoother. |
| <i>Group 5—Pryor—</i> | | |
| 507..... | Medium tall, drooping, long internodes, average number of leaves. | Latifoliate, base semi-obtuse auriculate, tip acute, surface slightly ruffled, medium light green colour. |
| 508..... | Slightly shorter internodes than 507..... | Latifoliate, base semi-obtuse auriculate, tip acute, surface slightly ruffled, medium light green colour. |
| 509..... | More drooping and shorter internodes than 508. | Latifoliate, base semi-obtuse auriculate, tip acute, surface slightly ruffled, medium light green colour. |
| 514..... | Tall growing, semi-drooping, long internodes, average number of leaves. | Latifoliate, long and broad, base obtuse decidedly auriculate, tip semi-acute, surface smooth, medium green colour. |
| 545..... | Grown in 1930 and 1931 only..... | |
| 546..... | Medium tall, drooping, long internodes, average number of leaves. | Latifoliate, base semi-obtuse decidedly auriculate, tip acute, surface smooth, silky, light green colour. |
| 548..... | Slightly taller than 509 otherwise same... | Latifoliate, base semi-obtuse auriculate, tip sharply acute, surface very puckered, dark green colour. |
| 549..... | Medium tall, semi-drooping long internodes. | Latifoliate, base semi-obtuse auriculate, tip sharply acute, surface very puckered, dark green colour. |

(c) Relative Maturity

The dark varieties and strains required at least 90 days to reach maturity. The number of days to maturity varied with the season. This seasonal variation was evidently more pronounced than the varietal variation. Although all varieties were harvested at the same time, under certain conditions, a few varieties showed signs of variation in the degree of maturity, when the cured

leaf was graded. Immaturity can be detected at this time by an unfinished appearance of the leaf and in extreme cases by the presence of mottled green leaves. On the other hand a high degree of gumminess in the cured leaf may be considered an indication of advanced maturity. Those varieties showing an advanced stage of maturity were considered early and vice versa.

Some details concerning relative maturity are presented in Table 11.

TABLE 11—MATURITY DATA—DARK

| Group number | Number of days from transplanting to topping | | | Number of days from topping to harvest | | |
|--------------|--|------|------|--|------|------|
| | 1931 | 1932 | 1933 | 1931 | 1932 | 1933 |
| 1..... | 47 | 59 | 57 | 42 | 37 | 35 |
| 2..... | 47 | 59 | 57 | 42 | 37 | 35 |
| 3..... | 47 | 59 | 57 | 42 | 37 | 35 |
| 4..... | 47 | 59 | 57 | 42 | 37 | 35 |
| 5..... | 47 | 59 | 57 | 42 | 37 | 35 |

NOTE.—Each group planted, topped, and harvested the same time.

(d) Relative Merits, Yield and Grade Index

In addition to the data already presented, further information relative to yield, quality and grade index was obtained. As in the other types, the grade value of the leaf was based on the average farm price paid for the better class tobacco in the district over the four-year period 1930-1933. When judging the relative merits of the leaf the wrapper quality also was taken into consideration. The yield was based on the quantity of leaf harvested after the bottom or ground leaves were removed.

The merits of these varieties, with individual yield and quality data, are presented below.

GROUP 1—GREENWOOD

The varieties in Group 1 produced a medium sized leaf, thick and gummy, giving a good percentage of dark wrappers. All were suitable for fire-curing. The four strains of Greenwood showed a variation both in yield and grade value, otherwise they were fairly true to type. Little Crittenden produced the lowest yield, but gave the highest grade index value.

Greenwood (501, 502, 503, 504) is one of the pioneer varieties of the dark type grown in Western Ontario, and is a popular variety with dark tobacco growers. It produced a medium sized waxy leaf, which was especially suitable for fire-curing. Unfortunately, like most dark varieties, Greenwood is very susceptible to black root-rot.

Brown Leaf (511) was provided by the Ross Leaf Tobacco Company, Kingsville. It has never been grown to any extent in Western Ontario outside of the classification test on the Station at Harrow. The leaf is shorter and thinner than Greenwood, and usually contains a lower percentage of first class, dark wrapper leaf.

Little Crittenden (519) was obtained from the Kentucky Experiment Station in 1930. It produced the highest percentage of medium weight dark wrappers in Group 1, and consistently showed good quality. Little Crittenden matured medium early and it gave good results when either air-cured or fire-cured.

GROUP 2—LITTLE HILL

Although the different strains of Madole (518, 547, 550), Rudolph Improved (515, 516), and Little Hill (505, 506), were fairly true to type in field growth, they varied considerably in yield and grade value. The Madole strains from the Bureau of Plant Industry, U.S.D.A., and the Kentucky Experimental Station gave a much higher yield than the strain from Bowling Green, Va. The grade index values, however, were quite similar. Rudolph Improved Mammoth from the Kentucky Station proved to be a superior strain to the Harrow Station strain. The Little Hill strain from the Bureau of Plant Industry, also proved slightly superior to the Harrow Station strain. The variety "Smith" gave the highest grade value in Group 2. All the varieties in this group were apparently well adapted for fire-curing. None of them showed resistance to the black root-rot disease. The cured leaf was medium thick and stretchy, and possessed a fair percentage of medium dark wrappers.

Little Hill (505, 506), although introduced in the early history of the dark-tobacco industry of Western Ontario, has never maintained a very wide distribution in the district. The texture of the cured leaf was slightly brittle and the venation rather prominent for best quality wrappers. The strain from the Bureau of Plant Industry, U.S.D.A. (506), gave more satisfactory results than the Harrow Station strain.

Rudolph Improved (515) was grown first on the station in 1926. It produced an average quality of wrapper leaf and was less promising than the Mammoth strain of Rudolph (516).

Rudolph Improved Mammoth (516) was obtained from the Experiment Station, Kentucky, in 1930. It produced a large, smooth leaf, semi-drooping in habit. The cured leaf usually graded out a fair percentage of good quality dark wrappers.

Madole (518, 547, 550) is also a dark fire-curing type and produces much the same type of leaf as British Snuff.

Smith (523) was first grown on the Harrow Station in 1926. It produced a medium sized, uniform, dark-coloured leaf, carrying plenty of body and elasticity. A fair percentage of the leaf graded into good quality, medium dark wrappers.

British Snuff (524) also has been grown on the Harrow Station since 1926. It was originally introduced into the district as a dark-fired curing variety. The leaf is too coarse in texture for good quality wrappers.

GROUP 3—ONE SUCKER

The term "One Sucker," is used when referring to a distinct type of air-cured dark tobacco. The true One Sucker produces a long "shoe string" type of leaf, with a heavy, prominent midrib. The variety (520) from the Kentucky Station grew true to type. The other two varieties have been selected for a slightly broader type of leaf. The demand for the One Sucker narrow leaf type, has increased during the past two years. Its long narrow leaf makes One Sucker a useful variety for stemming purposes.

GROUP 4—MAMMOTH

The varieties in Group 4 yielded above the average of those in previous groups. The leaves were large medium red and thin and lacked sufficient gumminess for good wrapper quality. Best results were secured by air-curing. Broad-bent (517) was the highest yielder and gave the best grade value. Kentucky Yellow (512) gave the lowest grade value. Seed of the different varieties was imported in 1930.

Yellow Mammoth (510, 544) strains were very similar and no apparent difference was noticeable between them. Both strains produced a broad thin type of leaf of a reddish colour.

Kentucky Yellow (512) gave a high yield but the general quality of leaf was below that of the other varieties in Group 4. *Kentucky Yellow* was obtained from Bowling Green, Va.

Imperial Yellow Mammoth (513) was obtained from Bowling Green, Va. It produced a thin, medium dark, smooth leaf and was slightly later maturing than Broadbent.

Broadbent (517) was obtained from the Kentucky Experiment Station. It produced a broad leaf which contained a fair percentage of medium dark wrappers.

GROUP 5—PRYOR

All the varieties in Group 5 are similar in type. The cured leaf was large, thin and stretchy, and consisted of cutters rather than wrappers. *Yellow Pryor* (508) from the Ross Leaf Tobacco Co., Kingsville, gave the highest yield and also the best grade value. The Harrow strain of *Yellow Pryor* gave the lowest yield and the poorest grade value. The Kentucky strain (509) compared favourably with the Ross Leaf Strain. Four strains of Pryor, including *Silky Pryor* (549), *Medley Pryor* (545), *Kentucky Pryor* (548), and *Improved Yellow Pryor* (546), were obtained from Bowling Green, Va. These strains were fairly uniform in yield and grade value. The varieties in this group appeared to be a few days later in maturing, although all varieties were harvested the same day.

Yellow Pryor (507, 508, 509) is a broadleaf type characterized in the field by its drooping and spreading habit of growth. It was grown extensively during the earlier stages of the dark tobacco industry of Western Ontario, between 1924 and 1928. Its spreading habit is found objectionable owing to the fact that the bottom leaves collect considerable mud and dirt when heavy rains occur at or near harvesting.

Clarksville (514) is a dark-fired strain which was obtained from the Kentucky Station in 1930. It produced a broad, thin leaf too light in weight and in colour for good wrapper quality.

Medley Pryor (545), a Bowling Green strain, produced much the same type of leaf as *Silky Pryor*, and gave good results when air-cured. It was introduced in 1930, and, like *Silky Pryor*, has not been grown in the district outside the Harrow Station.

Improved Yellow Pryor (546), in general appearance, resembled the other strains of *Yellow Pryor*. The cured leaf was thin and light in colour. *Improved Yellow Pryor*, also, was secured from Bowling Green, Va., and was grown at the Harrow Station for the first time in 1930.

Kentucky Pryor (548) was obtained also from Bowling Green, Va., in 1930, and, like many of the other dark strains from that district, it is not extensively grown in Western Ontario. The leaf is more sharply pointed than the other varieties in Group 5, and, when cured, showed a uniform dark colour. It was considered a fairly good air-cured variety.

Silky Pryor (549), as well, was obtained from Bowling Green, Va., in 1930. It produced a large thin leaf and is considered a fairly good strain of dark tobacco when air-cured.

In Table 12 information is presented on cured leaf qualities, yield and grade index values for individual varieties.

TABLE 12—QUALITY, YIELD AND GRADE INDEX

DARK VARIETIES

| Serial number | Cured leaf qualities | Per cent wrappers | Yield average | Grade index average |
|----------------------------|--|-------------------|---------------|---------------------|
| | | | lb. | |
| <i>Group 1—Greenwood</i> | | | | |
| 501..... | General quality good, fairly thick, short stretchy wrappers, colour dark brown. | 38 | 1,440 | 10.7 |
| 502..... | General quality medium, medium broadleaf type, venation fine and smooth, stretchy wrapper texture, dark brown colour. | 34 | 1,492 | 12.5 |
| 503..... | General quality medium, medium broadleaf type, venation fine and smooth, stretchy wrapper texture, dark brown colour. | 38 | 1,544 | 13.4 |
| 504..... | General quality fair, reddish colour, thin, lacking uniformity. | 16 | 1,584 | 12.5 |
| 511..... | General quality good, thick, stretchy, dark, well-finished. | 34 | 1,436 | 11.5 |
| 519..... | General quality good, medium dark, broadleaf type, venation fine, texture smooth and gummy, well-finished, plenty of elasticity. | 45 | 1,289 | 15.1 |
| <i>Group 2—Little Hill</i> | | | | |
| 505..... | Lacks uniformity, prominent midrib..... | 28 | 1,515 | 8.7 |
| 506..... | General quality fair, medium dark, medium stretchy leaf. | 31 | 1,539 | 10.0 |
| 515..... | General quality good, dark colour, fine venation, stretchy, long, broadleaf type. Not as uniform as 516. | 36 | 1,287 | 10.8 |
| 516..... | General quality good, dark colour, fine venation, stretchy, long, broadleaf type. | 49 | 1,723 | 11.7 |
| 518..... | General quality fair, reddish colour, lacking uniformity, slightly thin, medium broadleaf type. | 20 | 1,613 | 11.9 |
| 523..... | General quality good, colour dark, medium thick and stretchy, slightly short, medium broadleaf type. | 54 | 1,531 | 13.4 |
| 524..... | General quality fair, colour dark, body medium thick and stretchy, slightly coarse venation, medium broadleaf type. | 14 | 1,508 | 12.4 |
| 547..... | General quality fair, medium dark, medium thick body, fine texture and good stretch, medium broadleaf type. | 24 | 1,425 | 11.2 |
| 550..... | General quality fair, reddish colour, lacking uniformity, slightly thin, medium broadleaf type (less uniform than 158). | 8 | 1,669 | 11.2 |
| <i>Group 3—One Sucker</i> | | | | |
| 520..... | General quality good, very narrow, "shoe string" type of leaf, midrib prominent, medium red colour, lacking uniformity, thin and stretchy. | 33 | 1,325 | 14.3 |
| 521..... | General quality fair, medium thick and darker in colour than 520, also broader leaf and less prominent midrib. | 30 | 1,386 | 13.4 |
| 522..... | General quality fair, medium thick and darker in colour than 520, also broader leaf and less prominent midrib. | 18 | 1,296 | 10.3 |
| <i>Group 4—Mammoth</i> | | | | |
| 510..... | Slightly redder and thinner than 513, broadleaf type. | 27 | 1,659 | 12.6 |
| 512..... | General quality fair, medium dark colour, medium thin but very stretchy, fine smooth texture, large leaf. | 40 | 1,645 | 8.7 |
| 513..... | General quality good, medium thin with good elasticity, texture fine and smooth, medium dark long leaf, large broadleaf type. | 46 | 1,681 | 13.5 |
| 517..... | General quality good, medium body and good elasticity, texture fine and smooth, medium dark colour, broadleaf type. | 41 | 1,706 | 13.9 |
| 544..... | Slightly redder and thinner than 513, broadleaf type. | 30 | 1,645 | 11.7 |

TABLE 12—QUALITY, YIELD AND GRADE INDEX

DARK VARIETIES

| Serial number | Cured leaf qualities | Per cent wrappers | Yield average | Grade index average |
|-----------------------|---|----------------------|------------------|---------------------------|
| | | | lb. | |
| <i>Group 5—Pryor—</i> | | | | |
| 507..... | General quality medium, texture medium smooth and fairly elastic, body thin, light red colour, medium large leaf. | 29 | 1,462 | 10.7 |
| 508..... | Slightly thicker than 507 showing more uniformity. | 42 | 1,671 | 13.5 |
| 509..... | Resembles 507 but smoother texture..... | 37 | 1,659 | 12.6 |
| 514..... | General quality fair, body thin, medium fine texture, colour light red, broadleaf type. | 27 | 1,555 | 10.8 |
| 545..... | Grown in 1930 and 1931 only..... | | 1,583 | 11.7 |
| 546..... | General quality fair, body thin, colour red, ruffled shoulder, long broadleaf type. | 28 | 1,471 | 11.6 |
| 548..... | General quality medium thin, fair elasticity, medium dark, broadleaf type. | 22 | 1,523 | 11.7 |
| 549..... | General quality good, medium thin, good elasticity, dark colour, medium broadleaf. | 39 | 1,506 | 11.9 |

(c) Brief Discussion

Heavy dark wrapper quality was used as a basis for classification in this study. Out of a total of 31 varieties tested the following varieties gave the highest percentage of good quality dark wrappers:—

A—Suitable for fire-curing

- (a) Greenwood (503).
- (b) Little Hill (506).
- (c) Little Crittenden (519).
- (d) Improved Yellow Mammoth (513).
- (e) Rudolph Improved (515).
- (f) Broadbent (517).

B—Suitable for air-curing

- (a) One sucker (520).
- (b) Greenwood (503).

The growing of dark varieties is not one of the outstanding features of the Canadian tobacco industry at the present time. A fair quantity is grown, more for domestic than export purposes.

XI. GENERAL SUMMARY

Owing to the fact that a brief discussion and summary are presented at the end of the parts dealing respectively with the different types, little need be said here. It may be mentioned, however, that the general classification is based on field growth characteristics almost entirely, and that the grouping of certain selected varieties in the brief discussion, dealing with the various types respectively, is based on combined characteristics with particular reference to commercial adaptability. Growers, however, are advised to choose varieties best adapted to their conditions, since cured leaf qualities vary considerably from different soil types. Good quality is usually associated with earliness of maturity.

The colours in flue-cured tobacco vary from a lemony-orange to a mahogany or cherry red. The leaf colours in Burley range from a light straw colour to a reddish brown. Bright colours, fine, smooth texture and low gum content are desirable characteristics in the cured leaf which is to be used for cigarette and cut tobaccos. Heavy, gummy, stretchy leaf is usually associated with the heavy red Burley and dark tobaccos used in the manufacture of chewing and plug tobaccos.

In conclusion, it may be suggested that the chief advantage of such a publication as this exists in the fact that the information contained deals with a multiplicity of varieties and strains on a strictly relative basis.

XII. ACKNOWLEDGMENTS

In the course of the preparation of this paper liberal use was made of available literature dealing with classification studies on *Nicotiana*. The authors are particularly indebted to Prof. E. M. East of Harvard University; Dr. W. W. Garner of the U.S.D.A.; Prof. W. A. Setchell, University of California; and Prof. J. J. Johnson, University of Wisconsin, for their various publications and assistance through correspondence. The co-operation of a number of colleagues, which has made possible this study, is appreciated.

XIII. LITERATURE CITED

- Comes, O.—Monographic du genre *Nicotiana* comprenant le classement botanique des tabacs industriels. Atti del R. institute d'Incoraggiamento di Napoli, Ser. V. Vol. 1, 1899.
- East, E. M.—Heterozygosis in evolution and in plant breeding. U.S.D.A. Plant Industry Bul. 243, 1912.
- East, E. M.—The genetics of the genus *Nicotiana*. Bibliographia Genetica IV, 1928, Gravenhage, Martinus Nijhoff.
- Goodspeed, T. H.—Quantitative studies of inheritance in *Nicotiana* hybrids. University of California Publications in Botany, Vol. 5, No. 2. 1912.
- Goodspeed, T. H.—Hereditary reaction—system relations—an extension of Mendelian concepts. California—Reprinted from the Proceedings of the National Academy of Sciences. 1916.
- Johnson, James.—The inheritance of branching habit in tobacco. Reprinted Genetics 4:307-340. July, 1919.
- Johnson, James.—An improved strain of Wisconsin tobacco. Journal of Heredity 10:6: 279-286. 1919.
- Johnson, James.—Breeding tobacco for resistance to *Thielavia* Root-rot. U.S.D.A. Tech. Bul. No. 175. 1930.
- Setchell, W. A.—Studies in *Nicotiana*. University of California, Publications in Botany. Vol. 5, No. 1. 1912.
- Setchell, W. A. et al.—Inheritance in *Nicotiana tabacum*. University of California, Publications in Botany, Vol. 5, No. 17. 1912.

XIV. ILLUSTRATIONS



A plant of Warne, representing the stalk-cut type; a variety which was introduced with the Canadian flue-cured industry.



White Stem Orinoco, a variety which became prominent as the demand for a cigarette type of flue-cured tobacco became more evident in Canada. It replaced the Warne variety and is prominent as a priming type of flue-cured tobacco in the new belt.



Bonanza, a variety of cigarette flue-cured priming tobacco holding a prominent place in the old belt at the present time; it possesses fine fibre and a velvety texture and is early maturing.



An illustration of the broadleaf type of burley, drooping in type with coarse fibres.



A plant of Station Standup Burley, a variety which gradually replaced the old-fashioned broadleaf type; it is more semi-erect in growth with finer fibres.



Judy's Pride, a variety which replaced Station Standup, showing greater possibilities as a cigarette type of Burley; it possesses fine fibres and a velvety texture.



A plant of Standup Resistant Burley, a variety that became prominent as the demand increased for cigarette Burley; it is erect in type with fine fibre.

XV. APPENDIX

HARROW VELVET A NEW BURLEY VARIETY

In 1929, seed from seven strains of White Burley tobacco was obtained by the Dominion Experimental Station at Harrow from the Agricultural Experiment Station in Kentucky. These strains were the result of crosses made by Dr. Valleau of that Station. Since the relative resistance of varieties to black root-rot varies with climatic conditions Dr. Valleau was interested, in testing them under Canadian conditions. The different strains were planted in two sets of plots, healthy and diseased.

The results obtained in 1929 were not particularly promising. The tobacco produced from several of the strains on the healthy plot was thin and fluffy in nature and was not considered especially desirable for the market at that time. On the other hand, the strains made but little growth on the diseased plot and apparently were no better than the non-resistant varieties already in distribution. The following year another attempt was made to test the same strains. The plots were laid out as before, both on healthy and diseased soil. Again the results were more or less disappointing, except in one case; one strain designated as Valleau Selection No. 22, referred to as 335 in this publication, produced a single, apparently healthy plant. Seed was produced from this plant and when its progeny was planted the following year the results were very gratifying. The new selection produced a uniform healthy growth of plants superior in many ways to the parent strain. This high standard continued throughout the succeeding years, until the selection was considered worthy of the name "Harrow Velvet."

In some respects "Harrow Velvet" is different from the average Burley variety grown at the present time. It is erect in habit; the leaves are many, and grow quite close together on the stalk. While this variety is also bright in colour and contains a fine, velvety texture, its one outstanding character is earliness, and this is exceedingly important as far as maturity of most Burley crops is concerned. "Harrow Velvet" was tested during a period of years when the weather conditions were not especially conducive to the black root-rot disease. At the same time, it showed consistent resistance when other varieties failed to grow.

Like all good varieties, "Harrow Velvet" may not be satisfactory under certain conditions. Being of a light cigarette type, high yields cannot be expected on the lighter soils. Again, when grown on high fields, its erect habit of growth may make it more subject to firing and wind-bruising. Some also find it difficult to sucker. However, it has received favourable comment from several of the packers and seems to be well adapted to the more fertile Burley soils.

Key to Flue-Cured Varieties

A

| Serial number | Group number | Name of variety | Source |
|---------------|--------------|---------------------------------|---------------------------------|
| 1 | 9 | Warne..... | Exp. Sta., Harrow. |
| 2 | 9 | Warne..... | Bowling Green, Va. |
| 3 | 9 | Warne..... | Exp. Sta., N.C. |
| 4 | 9 | Warne (Loncke)..... | Imp. Tob. Co., Leamington. |
| 5 | 9 | Warne (Schlossen)..... | Imp. Tob. Co., Leamington. |
| 6 | 9 | Warne..... | Exp. Sta., N.C. |
| 13 | 4 | Hickory Pryor..... | Exp. Sta., N.C. |
| 14 | 4 | Hickory Pryor..... | Exp. Sta., Harrow. |
| 15 | 4 | Hickory Pryor..... | Bowling Green, Va. |
| 16 | 7 | Harrison Pryor..... | Exp. Sta., N.C. |
| 17 | 4 | Yellow Pryor..... | Exp. Sta., Harrow. |
| 18 | 4 | Yellow Pryor..... | Bowling Green, Va. |
| 19 | 4 | Yellow Bud Pryor..... | Bowling Green, Va. |
| 20 | 8 | Blue Pryor..... | Bowling Green, Va. |
| 21 | 5 | Adcock..... | Exp. Sta., Harrow. |
| 22 | 5 | Adcock..... | Bowling Green, Va. |
| 23 | 5 | Adcock..... | Exp. Sta., N.C. |
| 24 | 9 | Lizzard Tail Orinoco..... | Bowling Green, Va. |
| 25 | 6 | Lizzard Tail..... | Exp. Sta., Harrow. |
| 26 | 1 | Cash..... | Bowling Green, Va. |
| 27 | 1 | Cash..... | Exp. Sta., N.C. |
| 28 | 1 | Cash..... | Leamington, Ont. |
| 29 | 1 | Cash..... | Exp. Sta., Harrow. |
| 30 | 9 | Gold Leaf Loncke..... | Imp. Tob. Co., Leamington, Ont. |
| 31 | 8 | Gold Leaf..... | Exp. Sta., Harrow. |
| 32 | 9 | Improved Gold Leaf..... | Bowling Green, Va. |
| 33 | 6 | Big Orinoco..... | Bowling Green, Va. |
| 34 | 3 | Little Orinoco..... | Bowling Green, Va. |
| 35 | 2 | White Stem Orinoco..... | Exp. Sta., N.C. |
| 36 | 3 | White Stem Orinoco..... | Exp. Sta., Harrow. |
| 37 | 3 | White Stem Orinoco..... | Bowling Green, Va. |
| 38 | 3 | Yellow Orinoco..... | Bowling Green, Va. |
| 39 | 6 | Narrow Leaf Orinoco..... | Bowling Green, Va. |
| 40 | 9 | Wildfire Resistant Orinoco..... | Bowling Green, Va. |
| 41 | 9 | Long Leaf Gooch..... | Bowling Green, Va. |
| 42 | 8 | Broad Leaf Gooch..... | Bowling Green, Va. |
| 43 | 5 | Banana Leaf..... | Bowling Green, Va. |
| 44 | 6 | Willow Leaf..... | Bowling Green, Va. |
| 45 | 5 | Hester..... | Bowling Green, Va. |
| 46 | 2 | Bonanza..... | Bowling Green, Va. |
| 47 | 2 | Bonanza Ga. Strain..... | Agr. Exp. Sta., N.C. |
| 48 | 2 | Virginia Bright..... | Bowling Green, Va. |
| 49 | 2 | Virginia Bright..... | Oxley, Ont. |
| 50 | 7 | Pinkney Arthur..... | Agr. Exp. Sta., N.C. |
| 51 | 3 | Jamaica..... | Agr. Exp. Sta., N.C. |
| 52 | 3 | Gold Tip..... | Leamington, Ont. |
| 53 | 4 | Nancy's Best..... | Imp. Tob. Co., Leamington, Ont. |
| 54 | 1 | Jamaica Wrapper..... | Bowling Green, Va. |
| 55 | 4 | Silk Leaf..... | Bowling Green, Va. |
| 56 | 4 | Conqueror..... | Bowling Green, Va. |
| 57 | 2 | Harrison's Special..... | Delhi, Ont. |
| 58 | 2 | Yellow Mammoth..... | Oxley, Ont. |
| 59 | 3 | White Stem Willow Leaf..... | Delhi, Ont. |
| 60 | 4 | Charlie's Special..... | St. Thomas, Ont. |
| 61 | 2 | White Mammoth..... | London, Ont. |
| 62 | 3 | White Stem Mammoth..... | La Salette, Ont. |
| 63 | 7 | Yellow Warne..... | Lynedoch, Ont. |
| 64 | 3 | White Stem Orinoco..... | Lynedoch, Ont. |
| 65 | 3 | White Stem Pearl..... | Rodney, Ont. |

Key to Flue-Cured Varieties

B

| — | Serial number | Name of variety | Source |
|---------------------------------|------------------|---------------------------------|---------------------------------|
| <i>Group No. 1—Cash—</i> | | | |
| | 26 | Cash..... | Bowling Green, Va. |
| | 27 | Cash..... | Exp. Sta., N.C. |
| | 28 | Cash..... | Leamington, Ont. |
| | 29 | Cash..... | Exp. Sta., Harrow. |
| | 54 | Jamaica Wrapper..... | Bowling Green, Va. |
| <i>Group No. 2—Virginia—</i> | | | |
| | 35 | White Stem Orinoco..... | Exp. Sta., N.C. |
| | 46 | Bonanza..... | Bowling Green, Va. |
| | 47 | Bonanza Ga. Strain..... | Agr. Exp. Sta., N.C. |
| | 48 | Virginia Bright..... | Bowling Green, Va. |
| | 49 | Virginia Bright..... | Oxley, Ont. |
| | 57 | Harrison's Special..... | Delhi, Ont. |
| | 58 | Yellow Mammoth..... | Oxley, Ont. |
| | 61 | White Mammoth..... | London, Ont. |
| <i>Group No. 3—Orinoco—</i> | | | |
| | 34 | Little Orinoco..... | Bowling Green, Va. |
| | 36 | White Stem Orinoco..... | Exp. Sta., Harrow. |
| | 37 | White Stem Orinoco..... | Bowling Green, Va. |
| | 38 | Yellow Orinoco..... | Bowling Green, Va. |
| | 51 | Jamaica..... | Agr. Exp. Sta., N.C. |
| | 52 | Gold Tip..... | Leamington, Ont. |
| | 59 | White Stem Willow Leaf..... | Delhi, Ont. |
| | 62 | White Stem Mammoth..... | La Salette, Ont. |
| | 64 | White Stem Orinoco..... | Lynedoch, Ont. |
| | 65 | White Stem Pearl..... | Rodney, Ont. |
| <i>Group No. 4—Pryor—</i> | | | |
| | 13 | Hickory Pryor..... | Exp. Sta., N.C. |
| | 14 | Hickory Pryor..... | Exp. Sta., Harrow. |
| | 15 | Hickory Pryor..... | Bowling Green, Va. |
| | 17 | Yellow Pryor..... | Exp. Sta., Harrow. |
| | 18 | Yellow Pryor..... | Bowling Green, Va. |
| | 19 | Yellow Bud Pryor..... | Bowling Green, Va. |
| | 53 | Nancy's Best..... | Imp. Tob. Co., Leamington, Ont. |
| | 55 | Silk Leaf..... | Bowling Green, Va. |
| | 56 | Conqueror..... | Bowling Green, Va. |
| | 60 | Charlie's Special..... | St. Thomas, Ont. |
| <i>Group No. 5—Adcock—</i> | | | |
| | 21 | Adcock..... | Exp. Sta., Harrow. |
| | 22 | Adcock..... | Bowling Green, Va. |
| | 23 | Adcock..... | Exp. Sta., N.C. |
| | 43 | Banana Leaf..... | Bowling Green, Va. |
| | 45 | Hester..... | Bowling Green, Va. |
| <i>Group No. 6—Willow Leaf—</i> | | | |
| | 25 | Lizzard Tail..... | Exp. Sta., Harrow. |
| | 33 | Big Orinoco..... | Bowling Green, Va. |
| | 39 | Narrow Leaf Orinoco..... | Bowling Green, Va. |
| | 44 | Willow Leaf..... | Bowling Green, Va. |
| <i>Group No. 7—Pinkney—</i> | | | |
| | 16 | Harrison Pryor..... | Exp. Sta., N.C. |
| | 50 | Pinkney Arthur..... | Agr. Exp. Sta., N.C. |
| | 63 | Yellow Warne..... | Lynedoch, Ont. |
| <i>Group No. 8—Broadleaf—</i> | | | |
| | 20 | Blue Pryor..... | Bowling Green, Va. |
| | 31 | Gold Leaf..... | Exp. Sta., Harrow. |
| | 42 | Broad Leaf Gooch..... | Bowling Green, Va. |
| <i>Group No. 9—Warne—</i> | | | |
| | 1 | Warne..... | Exp. Sta., Harrow. |
| | 2 | Warne..... | Bowling Green, Va. |
| | 3 | Warne..... | Exp. Sta., N.C. |
| | 4 | Warne (Loncke)..... | Imp. Tob. Co., Leamington, Ont. |
| | 5 | Warne (Schlossen)..... | Imp. Tob. Co., Leamington, Ont. |
| | 6 | Warne..... | Exp. Sta., N.C. |
| | 24 | Lizzard Tail Orinoco..... | Bowling Green, Va. |
| | 30 | Gold Leaf Loncke..... | Imp. Tob. Co., Leamington, Ont. |
| | 32 | Improved Gold Leaf..... | Bowling Green, Va. |
| | 40 | Wildfire Resistant Orinoco..... | Bowling Green, Va. |
| | 41 | Long Leaf Gooch..... | Bowling Green, Va. |

Key to Burley Varieties

A

| Serial number | Group number | Name of variety | Source |
|---------------|--------------|-------------------------------|--------------------------------------|
| 301 | 2 | Judy's Pride..... | Bowling Green, Va. |
| 302 | 2 | Judy's Pride..... | Exp. Sta., Harrow, Ont. |
| 303 | 2 | Judy' Pride..... | Exp. Sta., Kentucky. |
| 304 | 2 | Judy's Pride..... | Bureau Plant Ind., U.S.D.A. |
| 305 | 3 | Kelley White Burley..... | Bureau Plant Ind., U.S.D.A. |
| 306 | 3 | Kelley White Burley..... | Exp. Sta., Kentucky. |
| 307 | 3 | Vimont Kelley..... | Exp. Sta., Kentucky. |
| 308 | 6 | Narrow Leaf Burley..... | Malden, Ont. |
| 309 | 4 | White Twist Bud..... | Exp. Sta., Kentucky. |
| 310 | 4 | Stoner..... | Exp. Sta., Harrow, Ont. |
| 311 | 1 | White Burley 36-12..... | Exp. Sta., Kentucky. |
| 312 | 4 | Broadleaf White Burley..... | Exp. Sta., Harrow, Ont. |
| 313 | 5 | Green Briar..... | Exp. Sta., Harrow, Ont. |
| 314 | 5 | Green Briar..... | Exp. Sta., Kentucky. |
| 315 | 4 | Red Burley..... | Exp. Sta., Kentucky. |
| 316 | 7 | Mammoth White Burley..... | Bureau Plant Ind., U.S.D.A. |
| 317 | 6 | Lockwood White Burley..... | Bureau Plant Ind., U.S.D.A. |
| 318 | 3 | Root-Rot Resistant White..... | Exp. Sta., Kentucky. |
| 319 | 6 | Hope Standup..... | Br. Leaf Tob. Co., Chatham, Ont. |
| 320 | 5 | Station Standup..... | Exp. Sta., Harrow, Ont. |
| 321 | 5 | Station Standup..... | Imp. Tobacco Co., Leamington, Ont. |
| 322 | 1 | Resistant Standup..... | Ross Leaf Tob. Co., Kingsville, Ont. |
| 323 | 1 | Standup Resistant..... | Exp. Sta., Harrow, Ont. |
| 324 | 6 | Broadleaf Resistant..... | Exp. Sta., Harrow, Ont. |
| 325 | 6 | C.R.B..... | Exp. Sta., Harrow, Ont. |
| 335 | 1 | Valleau Selection No. 22..... | Exp. Sta., Kentucky. |
| 336 | 1 | Valleau Selection No. 23..... | Exp. Sta., Kentucky. |
| 337 | 1 | Valleau Selection No. 24..... | Exp. Sta., Kentucky. |
| 338 | 1 | Valleau Selection No. 25..... | Exp. Sta., Kentucky. |
| 339 | 4 | Valleau Selection No. 26..... | Exp. Sta., Kentucky. |
| 340 | 1 | Valleau Selection No. 27..... | Exp. Sta., Kentucky. |
| 341 | 7 | Valleau Selection No. 28..... | Exp. Sta., Kentucky. |
| 342 | 1 | Valleau Selection No. 5..... | Exp. Sta., Kentucky. |
| 343 | 3 | Kelley..... | Br. Leaf Tob. Co., Chatham, Ont. |
| 344 | 2 | Halley's Special..... | Mr. Bondy, Harrow, Ont. |
| 345 | 2 | Halley's Special..... | Mr. Cohoe, Woodslee, Ont. |

Key to Burley Varieties

B

| — | Serial number | Name of variety | Source |
|----------------------------------|------------------|-------------------------------|----------------------------------|
| <i>Group No. 1—Stand-up—</i> | 311 | White Burley 36-12..... | Exp. Sta., Kentucky. |
| | 322 | Resistant Standup..... | Ross Leaf Tob. Co., Kingsville. |
| | 323 | Standup Resistant..... | Exp. Sta., Harrow, Ont. |
| | 335 | Valleau Selection No. 22..... | Exp. Sta., Kentucky. |
| | 336 | Valleau Selection No. 23..... | Exp. Sta., Kentucky. |
| | 337 | Valleau Selection No. 24..... | Exp. Sta., Kentucky. |
| | 338 | Valleau Selection No. 25..... | Exp. Sta., Kentucky. |
| | 340 | Valleau Selection No. 27..... | Exp. Sta., Kentucky. |
| | 342 | Valleau Selection No. 5..... | Exp. Sta., Kentucky. |
| <i>Group No. 2—Judy's Pride—</i> | 301 | Judy's Pride..... | Bowling Green, Va. |
| | 302 | Judy's Pride..... | Exp. Sta., Harrow, Ont. |
| | 303 | Judy's Pride..... | Exp. Sta., Kentucky. |
| | 304 | Judy's Pride..... | Bureau Plant Ind., U.S.D.A. |
| | 344 | Halley's Special..... | Mr. Bondy, Harrow, Ont. |
| | 345 | Halley's Special..... | Mr. Cohoe, Woodslee, Ont. |
| <i>Group No. 3—Kelley—</i> | 305 | Kelley White Burley..... | Bureau Plant Ind., U.S.D.A. |
| | 306 | Kelley White Burley..... | Exp. Sta., Kentucky. |
| | 307 | Vimont Kelley..... | Exp. Sta., Kentucky. |
| | 318 | Root-Rot Resistant White..... | Exp. Sta., Kentucky. |
| | 343 | Kelley..... | Br. Leaf Tob. Co., Chatham, Ont. |
| <i>Group No. 4—Broadleaf—</i> | 309 | White Twist Bud..... | Exp. Sta., Kentucky. |
| | 310 | Stoner..... | Exp. Sta., Harrow, Ont. |
| | 312 | Broadleaf White Burley..... | Exp. Sta., Harrow, Ont. |
| | 315 | Red Burley..... | Exp. Sta., Kentucky. |
| | 339 | Valleau Selection No. 26..... | Exp. Sta., Kentucky. |
| <i>Group No. 5—Station—</i> | 313 | Green Briar..... | Exp. Sta., Harrow, Ont. |
| | 314 | Green Briar..... | Exp. Sta., Kentucky. |
| | 320 | Station Standup..... | Exp. Sta., Harrow, Ont. |
| | 321 | Station Standup..... | Imp. Tob. Co., Leamington, Ont. |
| <i>Group No. 6—Long Leaf—</i> | 308 | Narrow Leaf Burley..... | Malden, Ont. |
| | 317 | Lockwood White Burley..... | Bureau Plant Ind., U.S.D.A. |
| | 319 | Hope Standup..... | Br. Leaf Tob. Co., Chatham. |
| | 324 | Broadleaf Resistant..... | Exp. Sta., Harrow, Ont. |
| | 325 | C.R.B..... | Exp. Sta., Harrow, Ont. |
| <i>Group No. 7—Mammoth—</i> | 316 | Mammoth White Burley..... | Bureau Plant Ind., U.S.D.A. |
| | 341 | Valleau Selection No. 28..... | Exp. Sta., Kentucky. |

Key to Dark Varieties

A

| Serial number | Group number | Name of variety | Source |
|---------------|--------------|-------------------------------|--------------------------------------|
| 501 | 1 | Greenwood (Home Grown)..... | Br. Leaf Tob. Co., Chatham, Ont. |
| 502 | 1 | Greenwood (Imp.)..... | Br. Leaf Tob. Co., Chatham, Ont. |
| 503 | 1 | Greenwood..... | Can. Leaf Tob. Co., Chatham, Ont. |
| 504 | 1 | Greenwood..... | Exp. Sta., Harrow, Ont. |
| 505 | 2 | Little Hill..... | Exp. Sta., Harrow, Ont. |
| 506 | 2 | Little Hill..... | Bureau Plant Ind., U.S.D.A. |
| 507 | 5 | Yellow Pryor..... | Exp. Sta., Harrow, Ont. |
| 508 | 5 | Yellow Pryor..... | Ross Leaf Tob. Co., Kingsville, Ont. |
| 509 | 5 | Yellow Pryor..... | Exp. Sta., Kentucky. |
| 510 | 4 | Yellow Mammoth..... | Exp. Sta., Kentucky. |
| 511 | 1 | Brown Leaf..... | Ross Leaf Tob. Co., Kingsville, Ont. |
| 512 | 4 | Kentucky Yellow..... | Bowling Green, Va. |
| 513 | 4 | Imp. Yellow Mammoth..... | Bowling Green, Va. |
| 514 | 5 | Clarksville..... | Exp. Sta., Kentucky. |
| 515 | 2 | Rudolph Improved..... | Exp. Sta., Harrow, Ont. |
| 516 | 2 | Rudolph Improved Mammoth..... | Exp. Sta., Kentucky. |
| 517 | 4 | Broadbent..... | Exp. Sta., Kentucky. |
| 518 | 2 | Madole (Downer)..... | Exp. Sta., Kentucky. |
| 519 | 1 | Little Crittenden..... | Exp. Sta., Kentucky. |
| 520 | 3 | One Sucker (Guthrie)..... | Exp. Sta., Kentucky. |
| 521 | 3 | One Sucker..... | Exp. Sta., Harrow, Ont. |
| 522 | 3 | Broadleaf One Sucker..... | Exp. Sta., Kentucky. |
| 523 | 2 | Smith..... | Exp. Sta., Harrow, Ont. |
| 524 | 2 | British Snuff..... | Exp. Sta., Harrow, Ont. |
| 544 | 4 | Improved Yellow Mammoth..... | Bureau Plant Ind., U.S.D.A. |
| 545 | 5 | Medley Pryor..... | Bowling Green, Va. |
| 546 | 5 | Improved Yellow Pryor..... | Bowling Green, Va. |
| 547 | 2 | Madole..... | Bowling Green, Va. |
| 548 | 5 | Kentucky Pryor..... | Bowling Green, Va. |
| 549 | 5 | Silky Pryor..... | Bowling Green, Va. |
| 550 | 2 | Madole..... | Bureau Plant Ind., U.S.D.A. |

Key to Dark Varieties

B

| — | Serial number | Name of variety | Source |
|---------------------------------|------------------|-------------------------------|---|
| <i>Group No. 1—Greenwood—</i> | 501 | Greenwood (Home Grown)..... | Br. Leaf Tob. Co., Chatham, Ont. |
| | 502 | Greenwood (Imp.)..... | Br. Leaf Tob. Co., Chatham, Ont. |
| | 503 | Greenwood..... | Can. Leaf Tob. Co., Chatham, Ont. |
| | 504 | Greenwood..... | Exp. Sta., Harrow, Ont. |
| | 511 | Brown Leaf..... | Ross Leaf Tob. Co., Kingsville, Ont. |
| | 519 | Little Crittenden..... | Exp. Sta., Kentucky. |
| <i>Group No. 2—Little Hill—</i> | 505 | Little Hill..... | Exp. Sta., Harrow, Ont. |
| | 506 | Little Hill..... | Bureau Plant Ind., U.S.D.A. |
| | 515 | Rudolph Improved..... | Exp. Sta., Harrow, Ont. |
| | 516 | Rudolph Improved Mammoth..... | Exp. Sta., Kentucky. |
| | 518 | Madole (Downer)..... | Exp. Sta., Kentucky. |
| | 523 | Smith..... | Exp. Sta., Harrow, Ont. |
| | 524 | British Snuff..... | Exp. Sta., Harrow, Ont. |
| | 547 | Madole..... | Bowling Green, Va. |
| | 550 | Madole..... | Bureau Plant Ind., U.S.D.A. |
| <i>Group No. 3—One Sucker—</i> | 520 | One Sucker (Guthrie)..... | Exp. Sta., Kentucky. |
| | 521 | One Sucker..... | Exp. Sta., Harrow, Ont. |
| | 522 | Broadleaf One Sucker..... | Exp. Sta., Kentucky. |
| <i>Group No. 4—Mammoth—</i> | 510 | Yellow Mammoth..... | Exp. Sta., Kentucky. |
| | 512 | Kentucky Yellow..... | Bowling Green, Va. |
| | 513 | Imp. Yellow Mammoth..... | Bowling Green, Va. |
| | 517 | Broadbent..... | Exp. Sta., Kentucky. |
| | 544 | Improved Yellow Mammoth.... | Bureau Plant Ind., U.S.D.A. |
| <i>Group No. 5—Pryor—</i> | 507 | Yellow Pryor..... | Exp. Sta., Harrow, Ont. |
| | 508 | Yellow Pryor..... | Ross Leaf Tob. Co., Kingsville. |
| | 509 | Yellow Pryor..... | Exp. Sta., Kentucky. |
| | 514 | Clarksville..... | Exp. Sta., Kentucky. |
| | 545 | Medley Pryor..... | Bowling Green, Va. |
| | 546 | Improved Yellow Pryor..... | Bowling Green, Va. |
| | 548 | Kentucky Pryor..... | Bowling Green, Va. |
| | 549 | Silky Pryor..... | Bowling Green, Va. |



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TOBACCO LITERATURE

- Bul. 175. Soil Texture in relation to Tobacco Growing in British Columbia.
- Bul. 176. Tobacco Growing in Canada.
- Bul. 178. Varietal Studies of Flue-cured, Burley and Dark Tobaccos.
- Pam. 165. The Irrigation of Tobacco in the Southern Interior Valleys of British Columbia.
- Cir. 49. Varieties of Tobacco Recommended for the Province of Quebec.
Report of Tobacco Division for the year 1930.
Report of the Experimental Station, Harrow, for the years 1928, 1929,
and 1930.

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